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Editor - Captain H. GARBETT, R.N. (Retired),

To whom all communications should be addressed.

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CONTENTS FOR FEBRUARY, 1908.

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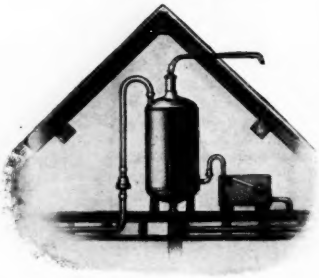

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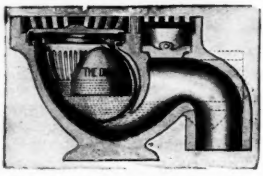

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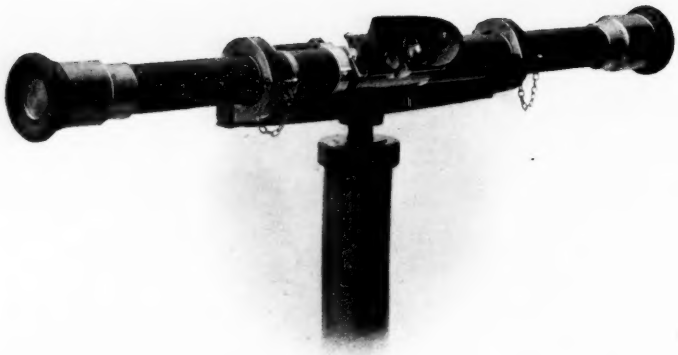

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ERRATUM.

On page 129, line 18, of January Journal, for the word "*tread*" read "*travel.*"

THE JOURNAL

OF THE

ROYAL UNITED SERVICE INSTITUTION.

VOL. LII. FEBRUARY, 1908. No. 360.

[*Authors alone are responsible for the contents of their respective Papers.*]

SECRETARY'S NOTES.

1. ROYAL VISIT.

Admiral H.R.H. The Prince of Wales, K.G., honoured the Institution by a visit to the Museum on Friday, January 31st.

2. ANNIVERSARY MEETING.

The Seventy-seventh Anniversary Meeting will be held in the Theatre of the Institution on Tuesday, March 3rd, at 4 p.m.

3. VACANCIES ON THE COUNCIL.

The following are the names of the Candidates nominated for the vacancies on the Council :—

Royal Navy (4 Vacancies).

Admiral Sir G. H. U. Noel, K.C.B., K.C.M.G. (Commander-in-Chief, the Nore).
Vice-Admiral Sir C. Campbell, K.C.M.G., C.B., D.S.O.
Rear-Admiral A. M. Field, F.R.S. (Hydrographer of the Navy).
Captain E. J. W. Slade, M.V.O. (Director of Naval Intelligence).

Regular Army (4 Vacancies).

Lieut.-General H. D. Hutchinson, C.S.I.
Lieut.-General R. S. S. Baden-Powell, C.B. (Divisional Commander, Territorial Army).
Major-General Sir G. H. Marshall, K.C.B.
Brig.-General Sir H. S. Rawlinson, Bart., C.V.O., C.B. (Commanding 2nd Infantry Brigade, Aldershot).
Brig.-General H. H. Wilson, D.S.O. (Commandant of the Staff College).
Colonel F. I. Maxse, C.V.O., C.B., D.S.O. (Commanding the Coldstream Guards).
Colonel W. Babtie, V.C., C.M.G., M.B. (Inspector of Medical Services).

Militia (1 Vacancy).

Colonel the Viscount Hardinge (7th Bn. the Rifle Brigade).
Colonel F. C. Romer, C.B. C.M.G. (6th Bn. the Lancashire Fusiliers).

Volunteers (1 Vacancy).

Lieut.-Colonel C. E. H. Hobhouse, M.P. (3rd V.B. The Gloucestershire Regiment), Under Secretary of State for India.
Lieut.-Colonel Honble. T. F. Fremantle, V.D. (1st Bucks V.R.C.).

4. OFFICERS JOINED.

The following Officers joined the Institution during the month of January :—

Lieutenant H. Bull, R.H.A.
Captain G. J. P. Goodwin, R.E.
Captain B. J. M. Luck, R.G.A.
Lieut.-Colonel C. A. Empson, late R.A.
Captain F. M. G. Du Plat Taylor, 4th Lancashire R.G.A. (Vols.).
Captain R. O. C. Hume, Border Regiment.
Lieutenant T. L. Hunton, R.M.L.I.
Captain C. H. Harington, D.S.O., The King's (Liverpool Regiment).

Major H. Storr, Middlesex Regiment.
D. Owen, Esq. (Lecturer, R.N. College).
Colonel V. M. Stockley, Indian Army.
Lieutenant R. F. U. P. Fitzgerald, R.N.
J. H. O. Gibb, Esq., late Lieutenant Warwickshire Imperial Yeomanry.
Second-Lieutenant W. D. Vyvyan, K.O. Shropshire Light Infantry.
Captain B. G. V. Way, The Sherwood Foresters.
Major-General E. O. F. Hamilton, C.B.
Brigadier-General H. H. Wilson, D.S.O.
Captain M. A. Hamer, Indian Army.
Captain Hon. R. H. Collins, D.S.O., Royal Berkshire Regiment.
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Lieutenant W. H. S. Ball, R.N.
Lieutenant J. B. Whitmore, 13th Middlesex V.R.C.
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Captain E. M. Birch, D.S.O., R.F.A.
Lieutenant C. A. L. Irvine.
Captain H. G. Gandy, R.E.

No officer of the Militia or the Royal Naval Reserve joined the Institution during the month.

5. A DISCUSSION.

On Thursday, February 20th, at 3 p.m., an important discussion will be held in the Theatre on the subject of "THE NATIONAL HORSE SUPPLY AND OUR MILITARY REQUIREMENTS." The Rt. Hon. The Earl of Donoughmore will preside. The Council hopes that all officers interested in the subject will endeavour to be present.

6. GOLD MEDAL ESSAY, 1908.

In reply to numerous inquiries as to whether military officers may compete for the 1908 Gold Medal Essay, the Council desires to intimate that all Officers, both naval and military, who are members of the Institution, or who are eligible to become members, may compete. The subject of the Essay is: "The Command of the Sea: What is it?"

7. LECTURES.

Field-Marshal Right Hon. The Earl Roberts, V.C., K.G., etc., etc., will preside at the Lecture to be delivered on Wednesday, February 19th, on "The Norwegian System of National Defence," by Lieutenant J. W. Lewis, West Kent Yeomanry.

Lieut.-General Sir H. L. Smith-Dorrien, K.C.B., D.S.O., General Officer Commanding-in-Chief, Aldershot Command, will preside at the lecture on Wednesday, February 26th, on "Staff Rides," by Brigadier-General H. H. Wilson, D.S.O., Commandant of the Staff College.

8. CONVERSAZIONES AND RECEPTIONS.

In view of applications having been received, the Council desires to intimate that the Museum is available only for Conversaziones and Receptions of recognised learned and scientific Societies and similar Institutions. The Theatre and a Committee Room can be used for the meetings of Naval and Military Societies and Institutions, the fee being nominal.

9. JOURNAL INDEX.

An Index of Subjects and names of Authors appearing in the JOURNAL from 1887 to 1906 (Vols. XXXI. to L.) has been compiled, and may be obtained at a cost of one shilling (inclusive of postage) on application to the Secretary.

10. REGIMENTAL COLOURS.

The Secretary is prepared to arrange for repairs to Regimental Colours and Cavalry Standards, in service or otherwise, at the Institution. A very large number has already been received during the past four years, and the repairs are executed at as small a cost as possible.

THE STRATEGICAL AND ECONOMICAL EFFECT OF THE OPENING OF THE PANAMA CANAL.

By ARCHIBALD R. COLQUHOUN, Esq., Gold Medallist, Royal Geographical Society.

On Wednesday, 6th November, 1907.
Major-General Sir T. FRASER, K.C.B., C.M.G., in the Chair.

ALTHOUGH it is not necessary, for the purposes of this paper, to enter into a detailed discussion of the controversial engineering questions which still occupy those engaged in the work of uniting the Atlantic and Pacific Oceans, yet it is essential to give, at the outset, some idea of the present state of affairs. Upon the type of canal finally selected and the time occupied in construction depend some of the strategic and economic effects with which we are concerned to-day.

Briefly, then, it must be said that, although the United States is resolved to make the canal, and though some nine million pounds have already been spent by her on this object, she has not yet arrived at a full decision as to how the work can best be done, much less as to the exact type of canal which will eventually be built. The work now proceeding is experimental, the sites for dams and locks are subject to reconsideration, and, although it was announced that of the three admissible schemes proposed a lock canal was the type selected, yet it was significantly added at the time that a sea-level water-way might ultimately have to supersede the lock canal.

Of the three projects the first had the support of a majority of eight members of the International Board of Consulting Engineers, in 1905. This was for a canal at sea-level with two locks, side by side, to regulate the tidal difference at Panama — 19 feet at certain times of the spring tides — at a cost of £50,000,000, the only project "giving reasonable assurance of safe and uninterrupted navigation." The second project is for a high-level "lake and lock" canal, the one so far adopted by the United States Government, which will have an artificial lake with an area of no less than 224 square miles, placed 85 feet above the sea. The estimated cost is £28,000,000 (not allowing for compensation for land submerged). The third project was for a lock canal of the usual type, with a summit level of 60 feet, cost £35,000,000.[1] The work so far is common to all three schemes, and may be carried on for some time yet without prejudicing the final adoption of either a sea-level or lock canal.

There can be no doubt that a sea-level canal should be aimed at, for it presents no difficulties which are not equally present in a

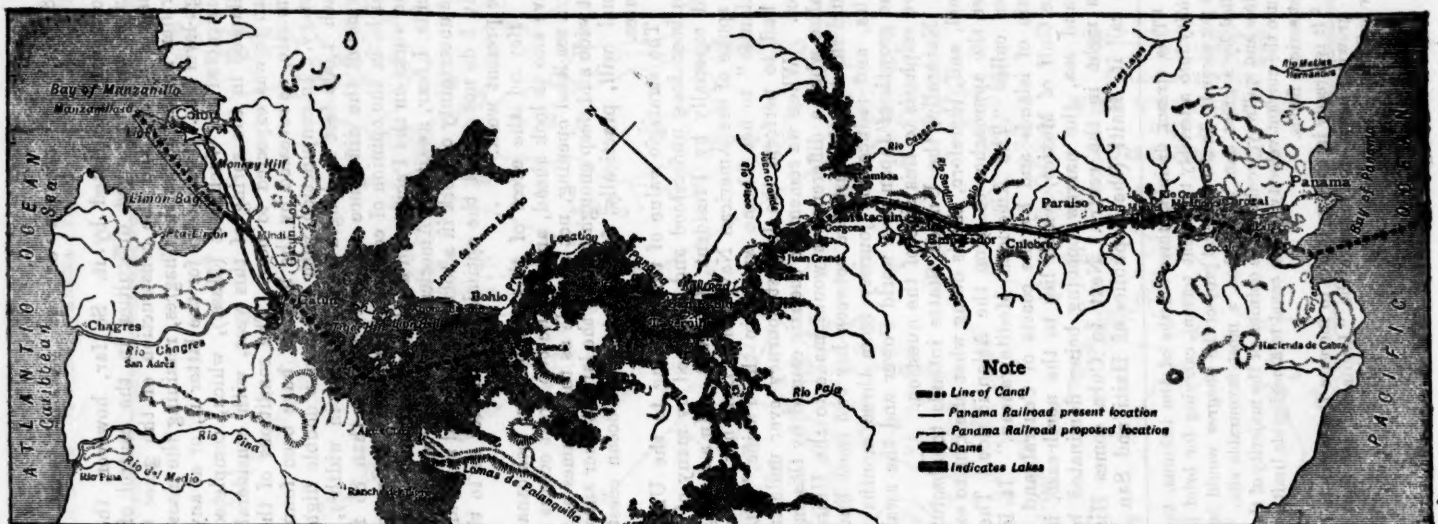
[1] This project was suggested by the Board of Consulting Engineers, in the event of the American Government deciding, *for reasons other than of an engineering character*, to build a lock-canal in the first instance.

lock system, and has many and great advantages. A most interesting recent contribution to the subject has been made by M. Bunau-Varilla, once chief-engineer of the French Panama Company, who believes that the Americans are on the wrong track in digging entirely in the dry, and advocates excavation under water—the use of the dredger, in place of the steam shovel—with the newly-perfected engines, improved since they were used with good results in the Manchester Ship Canal. He puts forward a scheme for a temporary lock canal, at 130 feet level, to be available for military or emergency purposes within six or seven years, while construction is still proceeding, and ultimately the opening of a passage so wide as to form the "Straits of Panama," and to be capable of carrying off the torrential waters which form the most serious engineering problem. This gigantic scheme, he estimates, would not take any longer, if constructed on the wet dredging system, than the work at present contemplated; would not cost more; and would be free from the objection to which all artificially protected works are open in countries subject to seismic disturbances. In the opinion of the Isthmian Canal Commission, however, it would cost £180,000,000, and take 60 to 70 years to complete. The principle advocated by M. Bunau-Varilla, and his estimates as to the comparative expense and efficiency of wet dredging (which he considers an essential feature of a sea-level scheme), have the support of such eminent authorities as Sir J. Wolfe Barry and Mr. W. Henry Hunter of the Manchester Ship Canal.

This scheme has not hitherto had the adherence of the United States Government, but it is by no means impossible that in principle it may be adopted later on. In any case, the weight of opinion of experts is so heavily on the side of a sea-level canal that this must *ultimately* be adopted, and, when this proves to be the case, some improved system of wet dredging will have to replace excavation in the dry. If the idea of a "Straits of Panama," therefore, does not eventually prevail, we shall at all events, I believe, yet see a deep and wide sea-level canal opened.

We have, therefore, to consider the effects of a canal which, in a temporary form with locks, will, in all probability, be opened in the life-time of many of us who are still not in our youth—within the next ten to fifteen years. I do not accept the sanguine estimate of President Roosevelt, still less that of M. Bunau-Varilla for his daring scheme. Whatever the view held as to the amount of excavation work actually accomplished on the canal by the giant steam shovels—which, for the past year, according to President Roosevelt, have been "making the dirt fly in good earnest"—there can be no doubt that in one respect a great advance has been made. The Americans have laid a solid foundation for their work by elaborate arrangements for housing and feeding, and rendering the canal zone and the towns of Colon and Panama outside the zone comparatively healthy (considering the latitude) for the army of 38,000 workmen now employed on the canal and railway. Yellow fever has been eliminated, and the mortality amongst the white employés is only a fraction over sixteen per thousand per annum.[1] This alone justifies the money they have spent, and the work of construction will be

[1] On the Tehuantepec railway, as on the Panama canal, the health conditions have been greatly improved by having the general offices, shops, and hospitals on high ground, where the heat is tempered by the constant winds.



PLAN OF THE PANAMA HIGH-LEVEL LAKE AND LOCK CANAL (Summit elevation 85 feet).

Length of Canal from shore to shore, is 40½ miles, width 200 feet at bottom upwards, minimum depth (on lock sills) 40 feet.

3 locks (1,000 by 100 feet) at Gatun }
1 lock at Pedro Miguel } In duplicate; two chambers, side by side.
2 locks at La Boca }

The summit level to be maintained by a large dam at Gatun and a small one at Pedro Miguel, giving the Gatun lake an area of 225 square miles. A second lake (55 feet level) to be made between Pedro Miguel and Panama Bay.

enormously facilitated by it. So far, however, they have still to reckon with ungauged difficulties in the control of the torrential Chagres River,[1] and the construction of the great Gatun dam, an earthen mound across the Chagres, retaining the mass of water in the high-level lake. The model for the latter is, or at any rate was, that constructed at Wachusett (Mass.), which, completed only in 1905, collapsed in the spring of this year, with considerably less pressure than it was expected to bear. The conditions of the subsoil at the dam site, as revealed by the borings, have been found to be unsatisfactory. In conjunction with the dam a double flight of three locks (each 1,000 feet in length and 100 feet in width[2]), in series, is to surmount the difference of level—no less than 85 feet—a proposal which, in the opinion of competent engineers, is fraught with danger. The works on the Pacific end are less sensational. Further disillusionments, I fear, await the Americans, who have not yet fully appreciated the uncertainty of work in a torrential tropical zone, and that is chiefly why I do not accept the optimistic estimates as to the conclusion of the present work.

Beyond the effect of this temporary lock-canal, however, we have also to look ahead, and see the two great oceans joined some day by a sea-level opening, not as wide as the Thames at London Bridge, yet wide and deep enough to take the largest liner afloat. This sea-level canal will, practically, form part of the ocean coast of the United States.

The strategic value of this opening to the United States itself has been long understood and preached by many of her public men, and especially by President Roosevelt. In a message the other day he spoke of the American Navy going from her "home waters in the Atlantic" to her "home waters in the Pacific," although to do so it had to perform the longest journey ever undertaken by such a fleet. When we remember the stir caused by this movement we can realise what a difference it would make to the United States if she could shorten the distance between her two coast lines by over 9,000 miles, and reduce the journey from three months to three weeks. The growth of Japan as a world Power and the awakening of China give emphasis to this side of the question.

Naturally, the United States intends to absolutely control the canal, and, therefore, she is doing what she can to exercise command over the approaches to it on the Atlantic side. The Caribbean has been called "The American Mediterranean." It is enclosed by a chain of islands and by the coasts of Central and South America. The Gulf of Mexico, which lies to the north-east, is practically an inland sea, the narrow opening being dominated by Cuba, which lies right in the centre. Next to Cuba comes Hispaniola, or, as we call it, Haiti (the Republics of Haiti and San Domingo divide

[1] This stream, draining three-fourths of the isthmus, turns with alarming rapidity into a terribly turbulent torrent, carrying for brief periods 70,000 cubic feet per second. In the sea-level project the Chagres would be confined and controlled by a great dam at Gamboa, a most favourable site. This dam, with its sluices and spillway, would in the opinion of the majority of the Consulting Board, reduce the currant velocity in the canal to a negligible limit, even in times of the most serious floods.

[2] It is already in contemplation to increase the width to 125 feet, in view of the growing beam—for instance the "Lusitania" (88 feet) and the battle-ship now building.

THE CONTROL
of the
CARIBBEAN SEA
STRATEGIC POINTS
BRITISH
UNITED STATES
OTHERS
ATLANTIC OCEAN
PACIFIC OCEAN
CARIBBEAN SEA
GULF OF MEXICO
UNITED STATES
MEXICO
VENEZUELA
COLOMBIA
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DUTCH GUIANA
FRENCH GUIANA

the island). Next to Haiti is Puerto Rico, and the Danish island of St. Thomas lies nearest to this. Now, between Cuba and Haiti, between Haiti and Puerto Rico, and between Puerto Rico and St. Thomas, are the three main passages which lead from the Atlantic into the Caribbean, and thus to Panama. There is another, of course, round the west and north-west of Cuba *viâ* the Yucatan Channel —the Florida Straits. Here is the American naval station of Key West. On the north-west of Cuba is Bahia Honda, and on the south-east again, sufficiently near to the Windward passage, is Guantanamo, which the United States have reserved as naval stations. The Mona passage, which cannot be controlled from Puerto Rico, is commanded from Samanha Bay, one of the few fine harbours in this region, on the north of Haiti. The third passage, the direct route to Europe, lies through the Danish West Indies. It was at one time considered not only possible but probable that these islands, which are of no value to their owner, would be bought by the United States, but international influence was brought to bear. There is no doubt that Germany would like the reversion of them, and the result of competition in the market will be to keep them neutral, for a time at all events. Through the group of British islands which fringe the eastern Caribbean—Grenada, Barbados, St. Vincent, St. Lucia, Dominica, Antigua—interspersed with the remains of the French possessions in Martinique, Guadeloupe, etc., lie minor alternative routes. A glance at a map will show how powerfully the United States already controls the Caribbean. Cuba is as good as American, Haiti she must and will occupy before long, Puerto Rico is hers. The western and southern coasts of the Caribbean—the weak Central American States, and Colombia and Venezuela—are practically under her heel, and here, it must be noted, there are few good harbours. As a matter of fact, the Colombian port of Carthagena is the only one, though the Chiriqui lagoon (in Panama) is a potential naval station. British Honduras is valueless strategically, and also economically. It should be traded or sold, for it might become a grave entanglement.

The position of Jamaica is the one inconsistency in the scheme for American control of the Caribbean, and if the policy of weakening our defences is followed it may also prove a serious embarrassment to us. It is, at present, a strategic point of the greatest potential importance, having a fine harbour, a healthy climate, and a valuable and industrious population. Of its historic associations I need not speak, but of its present economic state it is necessary to say a few words. Jamaica is certainly recovering from the depression consequent on the ruin of the sugar industry, and her recovery is largely due to the investment of American capital and the opening of markets for her fruit in the United States. But her prosperous condition is primarily due to the *ægis* of Great Britain, and to the condition of her negro population, which would be inevitably altered were she to come into the administrative orbit of the United States. I do not believe that her economic position would be bettered by gravitation to the States, while her political condition would be worse, and these considerations have full weight in the island itself.

When we consider the strategic position of the island, we shall feel that no adequate reason has been advanced for abandoning our hold on it. But, if we continue to occupy it, we ought to seriously consider the desirability of making it a strong, and not a

weak, point. There is no reason to postulate a naval war with the United States, in order to see the necessity of our retaining a sort of strong watch tower, and place of refuge or call, to protect our traffic through one of the great highways of the world. We may imagine the United States as neutral, and ourselves as contending with a European navy, bent on preventing our squadrons from reaching the Pacific, or from returning from it. I am not a naval strategist, but when I look at a map and realise that our short path to Australasia and the East, where lie so many of our possessions, is through the vulnerable Suez Canal, I feel that an alternative route—through the territory of a country which will, we trust, be always friendly, and at least neutral—may be of the greatest value to us, and that we ought to neglect no point of vantage which would help us to keep this passage open to us. Great Britain has one other fortified post in St. Lucia, which, though some distance from Jamaica, serves as an important link in communications and as a coaling station, and is provided with a useful adjunct in Barbados. With Trinidad to the south, and Antigua and Dominica to the north, these islands are well outside the American sphere, but they exercise an important influence on the Caribbean.

As has been said already, the Trans-Isthmian Canal at once sends up the value of the West Indies strategically, and, by diverting a great stream of traffic through the Caribbean, gives them fresh opportunities for economic development. For the British islands another possibility arises in the marvellously rapid growth of Canada. There seems no valid reason why Canada should not economically be to the British West Indies what the United States will ultimately be to Cuba. These regions are complementary to each other. If we are to realise the ideal of making our Empire self-supporting, we shall find use for all our tropical colonies.

The vast changes which have been taking place in the Pacific and in the Far East of Asia emphasise the value of this alternative route for Britain to India, the China Sea, and Australasia. Our main line of communication with the East—the Mediterranean and Suez Canal—is open to attack along the whole route from the English Channel to the Red Sea; and the aspirations of certain Powers for ports on the Persian Gulf, and even on the Mediterranean, and the possibility, by no means remote, that some Power may also cut across our direct line of communication with India and Australia—all these developments make the question of an alternative route to our dominions beyond the seas a very practical one.

Before leaving the subject of the strategic value of the Caribbean Islands, it may be useful to enumerate the principal ports. The United States has not secured so many of these as might appear from the extent of the Caribbean littoral over which she is now practically mistress. On the Gulf of Mexico there is practically no harbour, unless we include the terminus of the Tehuantepec Railway, unsuited for vessels of very heavy tonnage. New Orleans has been made a harbour by artificial means. The littoral of Central America is, as already noted, nearly harbourless, and Colon itself is practically defenceless. This lack has been now partially compensated for by the acquisition of Cuba, which, still nominally only under temporary tutelage, is practically annexed. Even when the Americans evacuated the island in 1904, they retained two fine harbours in Guantanamo and Bahia Honda—on the south-east and

north-west of the island, respectively—on a lease resembling that of Germany in Kiao-chau. They also reserved the Isle of Pines, which they later restored, as it is not suitable for a strategic post. On the north side of Cuba is the fine city and harbour of Havana, which was called by the Spaniards "the key of the New World," and the control of this immensely strengthens the supplementary strategic points of Pensacola and Key West. I have already referred to Samanha Bay in Haiti. Puerto Rico is a good jumping-off place, but has no proper port, which is one reason why the United States covet the Danish island of St. Thomas, with a really good harbour.

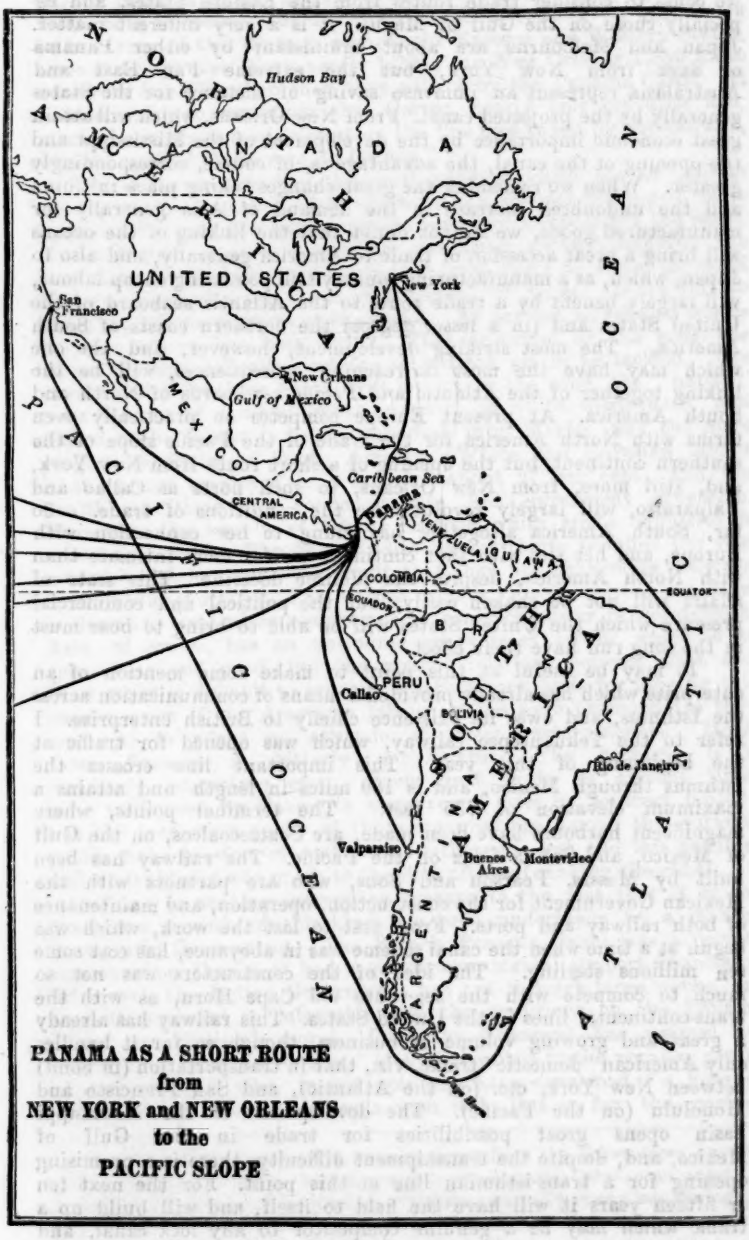
Obviously, the policy which has placed the United States in such a strong strategic position in the Caribbean, would be an anomaly were she not prepared to develop her naval power. Whatever may be the revulsion of feeling against Imperialism in the United States —and there is no doubt that the Philippine difficulty has temporarily engendered a good deal of "little Americanism"—the United States has embarked on a naval policy which she is not likely to abandon or abate. *L'appetit vient en mangeant.* When we consider the strategic effects of the canal, therefore, we must consider it as the possession of a nation with a growing Navy and a strong expansionist policy. If the canal is first opened some fifteen years hence, there will still be fields to conquer—undeveloped areas. The canal was pressed for by President Roosevelt as a protection for the Navy, and the increase of the Navy is now urged as a protection for the canal. Both canal and Navy will be stimulating forces to the United States, and will bring her more and more into the international arena.

The strategic and economic effects of a Trans-Isthmian Canal are so intimately interwoven that it is difficult to separate them, but, if we look at it from the point of view of trade routes, we find that Europe is by no means so much affected as the North American continent. The volume of trade between Europe and the East and Australasia will probably continue to go *viâ* Suez, and one result of the competing route may be to lower rates on that canal, and probably will be to widen and deepen it. The long Pacific journey, especially for European Powers not well supplied with coaling stations—a most important consideration—will prove an impediment to the Panama route to the East, and the distance from New York is only slightly in favour of Panama to Australasia, and even to Yokohama.[1] But, when

[1] Distances to Asiatic coast and Pacific islands by Panama and Suez :—

	Via Panama.	Via Suez.	To	Via Panama.	Via Suez.	
From New York.	10,016	12,790	Melbourne	12,575	10,670	From Plym'th
	9,851	13,320	Sydney	12,410	11,200	
	8,533	14,230	Wellington	11,092	12,110	
	11,521	11,556	Manila	14,080	9,436	
	12,915	10,170	Singapore	15,474	8,050	
	11,603	11,610	Hong Kong	14,162	9,490	
	11,726	12,360	Shanghai	14,285	10,240	
	10,086	13,040	Yokohama	12,645	10,920	

(From a paper on "Inter-Oceanic communication on the Western Continent," by Colonel G. E. Church, in R.G.S. Journal, 1902. The distances are taken from the U.S. Hydrographic and British Admiralty charts, certain discrepancies being adjusted).



PANAMA AS A SHORT ROUTE from NEW YORK and NEW ORLEANS to the PACIFIC SLOPE

we come to consider trade routes from the Eastern States, and especially those on the Gulf of Mexico, it is a very different matter. Japan and Melbourne are about equidistant by either Panama or Suez from New York, but the extreme Far East and Australasia represent an immense saving of distance for the States generally by the projected canal. From New Orleans, which will attain great economic importance by the development of the Mississippi and the opening of the canal, the advantage is, of course, correspondingly greater. When we remember the great changes taking place in China and the undoubted increase in the demand of Asia generally for manufactured goods, we cannot doubt that the linking of the oceans will bring a great accession of trade to America generally, and also to Japan, which, as a manufacturing country still possessing cheap labour, will largely benefit by a trade route to the Atlantic seaboard of the United States and (in a lesser degree) the northern coasts of South America. The most striking development, however, and the one which may have the most far-reaching consequences, will be the linking together of the Atlantic and Pacific sea-boards of North and South America. At present Europe competes on practically even terms with North America for the trade of the Pacific slope of the southern continent, but the opening of a short route from New York, and, still more, from New Orleans, to such ports as Callao and Valparaiso, will largely revolutionise the conditions of trade. So far, South America altogether has clung to her connection with Europe, and her ties with that continent are far more intimate than with North America, despite the Monroe doctrine. This state of affairs will not be shaken easily, but the political and commercial pressure which the United States will be able to bring to bear must in the long run have their effect.

It may be useful at this point to make some mention of an enterprise which has already provided a means of communication across the Isthmus, and owes its existence chiefly to British enterprise. I refer to the Tehuantepec railway, which was opened for traffic at the beginning of this year. This important line crosses the Isthmus through Mexico, and is 189 miles in length and attains a maximum elevation of 735 feet. The terminal points, where magnificent harbours have been made, are Coatzecoalcos, on the Gulf of Mexico, and Salina Cruz on the Pacific. The railway has been built by Messrs. Pearson and Sons, who are partners with the Mexican Government for the construction, operation, and maintenance of both railway and ports. From first to last the work, which was begun at a time when the canal scheme was in abeyance, has cost some ten millions sterling. The idea of the constructors was not so much to compete with the sea-route *viâ* Cape Horn, as with the trans-continental lines in the United States. This railway has already a great and growing volume of business, though so far it handles only American "domestic" traffic, viz., that in transportation (in bond) between New York, etc. (on the Atlantic), and San Francisco and Honolulu (on the Pacific). The development of the Mississippi basin opens great possibilities for trade in the Gulf of Mexico, and, despite the transhipment difficulty, there is a promising opening for a trans-isthmian line at this point. For the next ten or fifteen years it will have the field to itself, and will build up a traffic which may be a genuine competitor to any lock canal, and a serious rival to the ineffective Panama Railway, though it can

hardly hope to stand against a sea-level canal for large vessels from ocean to ocean.[1] The advantage of distance, however, will always be in favour of this route as regards the Eastern and Western States, since it brings New York nearly 1,200, and New Orleans 1,850 miles nearer to San Francisco than they will be by the Panama Canal. It is interesting to remember that Cortez, nearly four centuries ago, planned a military road, almost on the line now taken by the railway, which he called "the road to Cathay."

There is one aspect of the canal question which has an indirect bearing on the economic effect which we are now considering—I refer to the problem of the labour supply necessary to construct the canal. An operation of such magnitude, requiring (notwithstanding the perfecting of machinery) an army of from forty to sixty thousand men in constant work for a long period of years, cannot fail to affect the labour markets of the world. At present no reliable source for this labour has been found. The sanitation of the zone has solved the first difficulty, but the second has yet to be tackled. The negro of the Southern States will not go to the zone, the "native" peon labour of Central South America is quite inadequate, and indeed coolie labour is being imported into Mexico and the more progressive States of South America. White and Eurasian labour is at present employed in a ratio of about 27 per cent., and the health conditions now render it safe, but enormously expensive. Moreover, the supply of labour in true white men's countries is notoriously short. The West Indies have hitherto supplied the best non-white labour, with the result that they are themselves suffering from labour-shortage. The British islands, whose negroes are most in demand, must place restrictions on contract labour in self-defence. Asia, of course, has an unlimited reservoir of labour which is at once cheap and good, but the present relations between East and West make it difficult to arrange a satisfactory basis for tapping this reserve, even if the American labour unions were prepared (as they are not) to adopt an attitude of sweet reasonableness. Moreover, Panama is bitterly anti-Asiatic. The problem is a peculiarly interesting one. Such great works in ancient times were performed by slaves, in more recent ones by contract labour; but the increasing power of those organisations among the workers which make freedom of contract on either side less and less possible will undoubtedly add much to the difficulties of making the canal.

There is another interesting feature in the fact that it is the first time a work of this kind has been undertaken by a modern democratic Government. The French Panama Canal was a private undertaking, though it had a quasi-governmental support financially. Of course, the Indian Government has put through large works, but that Government is autocratic, and the conditions on the Panama Canal are distinctly novel. President Roosevelt has assured his countrymen that the work is "of a kind suited to the peculiar genius of our people," who, in his opinion, have developed "a type of character best fitted to grapple with it." But so far the constant

[1] In view of the competition to be expected from the Tehuantepec line Mr. John F. Wallace, formerly Chief Engineer to the Panama Canal, even urged the complete reorganisation and operation of the Panama Railway at a loss, during the period of construction of the canal. He pointed out that there must always be a considerable amount of trans-shipment on the canal.

changes and uncertainty have hardly sustained the theory. After some hesitation as to how the work was to be carried out—an attempt being made to carry out the work through a commission of engineers, and others having no special experience—the canal commission invited tenders from leading contractors; but apparently the conditions were too onerous, too complex, and too speculative, to attract a really responsible class of contractor, and, since March 1st of this year, the plan adopted is to do the work as a quasi-military undertaking, through army engineers. One advantage of this will be to secure some permanence in the directing staff, which had hitherto been in a constant state of change. One chief engineer after another, and a stream of commissioners, have made it impossible to secure continuity in the engineering policy or the administration, which however, we are now assured, is at last "working harmoniously" and is there to stay till the completion of the canal.

From the brief description which is all I have space for here, it will be seen that it is difficult to make any dogmatic pronouncement on the possible strategic and economic effects of the canal, which will, I believe, eventuate sometime during the first quarter of the twentieth century. In broad outline, however, I have attempted to show that the immediate result, not contingent even on the completion of the canal, will be a great naval development of the United States. The first result, once the canal is opened, will be the growth of her commercial marine and her trade with South America and the Far East—possibly with Australasia. I have also tried to demonstrate the strategic importance to Great Britain of retaining a stronghold in the Caribbean, and the value, both economic and strategic, of an alternative route to the Pacific.

On one aspect of the canal I have not been able to dwell, and I suggest it now, without comment, for the thoughtful consideration of my hearers. This opening from Atlantic to Pacific finally destroys the isolation of the East. It brings the round globe into equally intimate relations in all its parts, and unites the East and West by a growing stream of communication.

Let us hope that, before the Panama Canal is an accomplished fact, the English-speaking peoples will have found some reasonable and logical basis on which to found their intercourse with the East.

Major E. M. Paul, R.E. :—I hardly expected that I should be called upon to open the discussion this afternoon. First of all, I should like to express a word of appreciation of the excellent paper we have had from Mr. Colquhoun. He has marshalled his facts very ably, and I am sure each and all have been very much interested in what he has said. It may not be out of place, perhaps, to draw attention to the opinion of so able an expert as Captain Mahan, of the American Navy, upon the real interests of the British nation in the Panama Canal, and with your permission I would like to read the following extract: "The same national characteristics that of old made Great Britain the chief contestant in all questions of maritime importance with Holland, with France, and with Spain, have made her also the exponent of foreign opposition to American asserted interests in the Isthmus. The policy initiated by Cromwell of systematic aggression in the Caribbean, and of naval expansion and organisation, has resulted in a combination of naval force, with naval positions unequalled, though not wholly unrivalled, in that sea. And since, as the great sea carrier, Great Britain has a preponderating natural interest in every new route open to commerce, it is

inevitable that she should scrutinise jealously every proposition for the modification of existing arrangements, conscious, as she is, of power to assert her claims in case the questions should be submitted to the last appeal." Captain Mahan further goes on to record his conclusion that, "It is recognised, however, by British politicians that the bearing of all questions of isthmian transit upon American national progress, safety, and honour, is more direct and urgent than upon British." I quote from Captain Mahan's book upon "America's Interest in Sea Power," page 83. I do not think anyone present would seek to contest this statement or question the conclusion at which he arrives. Undoubtedly the interests of the United States are both commercial and political, whereas with other States in Europe the interests are mainly commercial. Attention has been drawn by the lecturer to one side of our commercial interests, when he spoke of the West Indian labour market. The prosperity of the West Indies must depend very largely upon abundance of labour and cheap wages; and although Americans may not be very sensitive as to how the Canal is made, whether dug by white, yellow, or black people, at the same time, it does behove British politicians and others to see that the British West Indian Islands are not adversely affected in this respect. I think it may be interesting to compare the position which will be occupied by the Panama Canal in the future, with the Suez Canal. The Panama Canal will find, prior to its existence, already very strong and well established competitors in the shape of American and Canadian railways from sea to sea; the Tehuantepec railway also will undoubtedly be a keen rival, and may have a very direct influence upon the commercial success of the Panama Canal, and, as it is an accomplished fact, it is important to take it into account. On the other hand, the Suez Canal was the first real route to the East to be made, and has still no rival in the way of communication, and never will until some connecting link is made between the Mediterranean and the Persian Gulf, either by the Euphrates Valley or other railway.[1] In the matter of trade, in the South American Continent I believe I am correct in stating that the amount of trade between the North American States and the Western, North-West and Northern coasts of South America, and the coast of Chili, is relatively very small. I do not think the South Americans appreciate the United States business methods, and they are not very fond of them, as the lecturer pointed out. So that, figuratively, beyond the actual transfer of the Straits of Magellan —a stormy and dangerous route—to a secure one at Panama, when the Canal is opened, there will not necessarily follow any very great practical results as far as the States of South America are concerned. Moreover, one has to remember that a very large percentage of the world's trade is carried in tramp steamers, which coast from place to place, and would not, therefore, be willing to go *viâ* the Panama Canal, forfeiting a good deal of the coast trade. So that possibly the Panama Canal may only be looked upon with particular favour by those vessels which are carrying a perishable freight, whose owners may be prepared, in return for speedy delivery, to pay the transit dues, which I cannot help but feel must inevitably be high, because the expenditure on the Canal will be enormous. At the same time there can be no doubt that *eventually*, in the

[1]After being established some forty years, the Suez Canal—thanks to foresight, and consideration by the Canal Commissioners—has kept abreast of modern requirements, so that from the very date of opening of the Panama Canal as an ocean highway, the Suez Canal will still be a superior waterway capable of passing modern vessels of heavy tonnage and deep draught.—E.M.P.

course of years, the Panama Canal will induce a very great increase in commercial activity through the Caribbean Sea, and that it will become a great thoroughfare. I think the effect also will be to stimulate the ship-building industry of the United States. Really, a very small percentage of American trade is carried in American bottoms—about one-tenth, I believe, is carried by American ships, one-half by British ships, and the remainder by ships of other flags. The Canal would profit mainly in the trade between the Atlantic States and the Far East, because it is evident that the route will be so very much shortened. But, on the other hand, the rival railways may cheapen their freights and so cut out the Canal. New York will be much nearer to China by sea, but that will not necessarily confer any commercial advantage. On the other hand, it will give the United States a very preponderating influence in the trade of the Far East, and especially in the Pacific, as they have completed their chain of coaling stations with Hawaii and the Philippines, so that they are at a certain advantage. Admiral Dewey opposes very strongly any idea of the sale or handing back of the Philippines, and fears, naturally, that if the Philippines get into the hands of Japan that Power would control the whole of the Orient, and America would have to take a back seat. Coming now to the strategical aspect, it is evident that every position in the Caribbean and Pacific will have an increased value in the future—Hawaii and Curaçao, which latter has not been mentioned, an important island belonging to the Dutch, the British West Indies, notably Jamaica, and other islands. The United States, of course, is prepared to accept the present territorial ownership, but it is not likely that they will tolerate any encroachments in the future. They, therefore, must be prepared to back all these Central and other American States against the foreigner, and, moreover, to control their relations with one another. The task of doing so will no doubt be a very difficult one, and it is a matter open to question whether it will be equally appreciated by these several States. The lecturer has drawn attention to the fact that the Americans will have to increase their Navy, and I think that is one of the very important results that will follow from this undertaking—the Panama Canal, for unless the Americans are paramount in the Caribbean Sea, their position must be a very insecure one; the Canal must always be a well defined, and, therefore, vulnerable point. There is hardly any doubt that, in a case of hostilities, the Panama Canal will eventually fall to the belligerent that controls the Caribbean, for the control of the Caribbean means the control of the entrance to the Panama Canal. The policy of the United States, concurrently with rapid development and progress in the Western Pacific States and advance of civilisation in Japan and China, has necessarily become aggressive in the last few years, and it will be a repetition of what happened in Britain in the time of Queen Elizabeth, after the wars with Spain.[1] The only other Power that really possesses a preponderating influence in the Caribbean is Great Britain. In Jamaica, St. Lucia, Barbadoes, and Trinidad, we certainly have great vantage points. It can hardly be to British interests to oppose America, and it seems better for the United States that those strategic positions should remain in British hands and so be denied to any other nation in case of

[1]At that time the trend of British policy was Westward, but, with the opening of the Suez Canal—three centuries later—it was diverted more and more to the East Indies. In like manner American policy will veer more and more to the North Pacific and China Seas, as the Panama Canal is cut.—E.M.P.

conflict between the United States and another Power, either European or Eastern, singly or in combination. I think, therefore, it behoves Great Britain *to hold on very tight* to what she has got, to consolidate, and not to evacuate or hand over that which has been won with considerable expenditure of blood and treasure. By holding on to what she possesses, she can well afford to let the Americans defend the Caribbean against other nations; and the position of Great Britain in the Caribbean, backed by her naval supremacy, will, I think, go a long way towards maintaining the cordial relations which exist between the States and ourselves at the present time.

Captain E. F. A. Gaunt, C.M.G., R.N. :—You will forgive me if what I have to say is not quite as connected as the remarks of the last speaker, but I only landed from the South Pacific three days ago. I immediately saw the notice of the lecture, and came here to-day and listened to it with very great interest. Eighteen months ago I was at Panama, and the Americans, with their customary courtesy, showed me everything there was to be seen, both as to the cuttings and their plans for future operation. The lecturer seems somewhat pessimistic as to the time they will take in making this canal, but the Governor of the Zone and the chief engineer were very optimistic. They told me that, if the Canal Commission permitted them to make the high level canal, an 85-foot canal, they would answer for its being completed in seven years, roughly. With regard to the sea-level canal, they could see no limit to the cost, and no limit whatever to the time it would take to construct. The main difficulty, as the lecturer told you, is the Chagres River. I think it was only the week previous to my being there that the river rose 18 feet in two or three hours, so that you will see the great difficulty the engineers have to contend with. They see their way to overcoming that difficulty with the high level canal, but not with the low level canal. The lecturer dwelt on the absence of ports on the East coast of Central America; but on the West coast, when the canal is opened, it will be very close to some excellent ports. For instance, there is Acapulco, which has a very good harbour; San Salvador, which may be improved; and Punta Arenas, which may be made into a very good port indeed. I am sorry to say that for many years our eyes have always been fixed on the Near East instead of on the Far East and Australasia. The two maps on the wall ought to be reversed, and then we would look at the things in a practical way. At the present time no one looks at it like that. At present people simply look at it in their mind's eye, or they try to, and it is a failure; but if you had that map over on the other side you would see how the connection lies between the Panama Canal and Australia and New Zealand. Mr. Colquhoun has not said very much about those places. They are, I think, not only very important, but they will become more and more important, not only in their own estimation, but in the estimation of the world. Anything that will tend to weld New Zealand and Australia to Great Britain is of the utmost value. So far from giving up possessions, it is very necessary that we should acquire one or two more. If you look at the islands in the Pacific, I think anyone who considers the question at all must realise that it is of the utmost importance, before the Panama Canal is opened,

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Note.—It may be of interest to note that the range of tides on either side of the isthmus varies considerably. At Panama (Pacific) as much as twenty feet; at Colon (Caribbean) less than two feet, so that even with a sea-level canal, locks at the Panama entrance would appear to be almost a necessity.—E.M.P.

that we should acquire certain islands there as coaling stations between Australia and New Zealand and the Panama Canal, because those islands are almost on the direct line of route.

Mr. F. P. Petre :—I should like to make a few remarks on this interesting lecture, although I did not come here with the intention of speaking. The first point to which I should like to allude is the reference by Major Paul to the South American States and their commerce. I speak of the State which I know most, Colombia. I think there is a great opening for trade on that coast, and for the territory lying a little inside, that is the Cauca Valley. Although I have not been there, I believe it is one of the richest valleys in the world, not only in minerals, but also in agricultural products. It is now being joined to the Pacific by a railway, which I think will be shortly opened, on which there ought to be a very large traffic from that region. I have no doubt that other countries too, like Peru, would like to have similar opportunities for trade. Everybody seems to be agreed that, if possible, the Panama Canal should be made to the sea level. As you know, there are three projects. The estimate for the first project for a sea-level canal was, according to Mr. Hunt's article in *The Times*, nearly £50,000,000. I am sorry to hear from the last speaker that the engineers on the Panama Canal are not so sanguine with regard to the construction of a sea-level canal as they were. The estimates for the other two projects were, I think, about £28,000,000 and £35,000,000. But, in addition to the amount of those estimates, there are the sums which the United States have already paid, namely £2,000,000 to Panama, and £8,000,000 to the Company which did the first work. They have to pay interest on those sums, and also a rent of £50,000 a year, commencing from, I think, 1913. In addition to the sums they have already paid, they will have to expend at least thirty or forty millions more, so that there is hardly any reasonable hope that dues which could possibly attract traffic would cover the expenditure on the interest and upkeep of the canal. The upkeep of the canal will, I believe, be very much heavier in a lock canal than in a sea-level canal, and, moreover, there is always the risk of damage from earthquakes, which, though not very common in that part of the Isthmus, are common enough a little further off. It seems to me perfectly clear that no company could ever hope to make the canal pay a reasonable dividend to its shareholders. Just in the same way, the United States Government cannot hope to make it pay a dividend to them in cash, but it can hope to make it pay in other ways. For instance, at present they must have their fleet in the Atlantic, and another in the Pacific, and when they want to reinforce one from the other it takes them two or three months to do so. When the canal is opened, they will be able to reinforce the one fleet from the other, especially if they have a central reserve in the Caribbean Sea, in less than half the time they require at present. That, it seems to me, must save them millions sterling per annum in their fleet expenditure. If the sea canal is practicable at a reasonable price—and I think fifty millions is a reasonable price—I think the American people would not mind the expenditure of that amount of money. But American opinion is not ready yet to swallow the prospect of having to pay two or three million pounds a year interest out of their pockets for ever and a day. If, on the other hand, the cost is gradually brought home to Americans, they will be more likely to take it quietly. Whatever is done, it will be a very considerable time before the engineers come to the parting of the ways, when they have to decide once and for all whether they will have a lock canal or a

sea-level canal. Until that point is reached there is no necessity for a decision, and it seems to me the United States Government would not be anxious to make it until the last moment. The present Government has already committed the nation irrevocably to the canal. They have spent ten or twenty million pounds on it, and they are not going to throw that amount of money into a ditch, and let it go. Nothing much has been said about the climate of Panama, except that the Americans have succeeded in getting rid of yellow fever. They may have got rid of yellow fever, but I doubt if they have got rid of the malaria. I have been for three weeks on the Magdalena River, where the climate is pretty bad; but of all the horrible climates I have ever been in I think that of Colon is the very worst, and I do not believe you will ever get labourers to live there in good health.

Admiral Sir NATHANIEL BOWDEN-SMITH, K.C.B. :—I did not intend to take part in this discussion, but having in the spring of last year paid a short visit to Colon and the West Indies, I may offer a few remarks. I should like to bear testimony to the great hygienic improvements that the Americans have made in that Isthmus since they have taken up the work of the canal. It has been said that when the railway was under construction there was a dead man buried under ever sleeper. At present the mosquitoes have, to a great extent, disappeared with the draining of the swamps, and good hospitals have been built. I need not say that I received the civility and attention which one always does meet with from our cousins over the water. As regards the different sorts of canals which have been suggested; my old friend and shipmate, Captain Gaunt, told you why the Americans have adopted the high-level scheme, the sea-level plan entailing such an enormous expenditure and such a long time to construct. With regard to the question of labour, we took, in the Royal Mail, to Colon from Barbados some 200 or 250 natives to work on the canal, and I was informed that after two years many of them come back to their native island and enjoy the money they have earned at Panama. With regard to the strategical position of Jamaica and the West India Islands, they will doubtless become more important when the canal is completed, but I agree with our recent policy in withdrawing our ships and garrisons from those islands. It is impossible for us to police the whole world, and the time has come when we must recognise that great nation on the other side of the water (the United States) as being the proper Power to police those seas, and to prevent any improper interference with the Panama Canal and its traffic. We have not hitherto kept a sufficient garrison at Jamaica to protect the island against a really serious attack, and, therefore, the expense of maintaining our recent forces there was not justified. I visited several of the islands, and, although, of course, the Governors do not like the troops being withdrawn—no Governor likes his garrison and fleet taken away—I did not understand that any of them anticipated difficulties with the natives in consequence. As far as the Navy is concerned, we can always send a squadron out there very rapidly. One speaker referred to the unpleasant climate of Panama. I evidently must have been fortunate in that respect, for I spent two nights at Colon, which were very agreeable. There was a beautiful breeze blowing through the ports, and the railway journey across the Isthmus to Panama and back, though hot, was not unpleasant. I think the lecturer said that Jamaica had a beautful harbour, a fine climate, and an industrious population. I agree with his first two conclusions, but I am not certain about the third, the industrious population.

Mr. COLQUHOUN :—I said comparatively.

Admiral Sir NATHANIEL BOWDEN-SMITH :—I think it is very comparative. The great complaint out there, by anybody who is trying to run any undertaking in the sugar or banana growing, is that they cannot get the natives to work systematically and regularly. The natives of Jamaica are rather inclined to beg. One day, when looking on at a country cricket match, a boy in the long field near where I was standing asked me for a shilling to help him to buy a new hat. On another occasion I got into conversation with a native policeman, while waiting for the tram, who seemed intelligent and had pleasant manners. After a little while he said, "I beg your pardon, but may I ask you a question?" I said "Certainly," and supposed he was going to ask me something about England, or some other place, but he said, "I have been six months on this beat, and I have never had a tip yet!"

Mr. BASIL WILLIAMS :—May I ask one question of the lecturer before he replies to the discussion? I should like to ask him if he has at all considered what the effect of the Panama Canal would be supposing we started an "All Red" route. The "All Red" route was a good deal discussed at the last Imperial Conference, and is, I understand, being a good deal discussed by various government departments now. Of course, if such a route is made it will mean a considerable amount of national expenditure in the way of subsidies, not only from England, but from Canada, New Zealand and Australia; and I should very much like to know the lecturer's opinion as to how far that money would be wasted or not if the Panama Canal were opened within seven years, or even ten years.

Mr. A. R. COLQUHOUN, in reply, said:—I will attempt to reply very briefly indeed to the few points which have been raised. First of all, in considering the question of strategy, I would ask you for the moment to dismiss from your minds my paper altogether and allow me in a few words to try and gather up what I conceive to be the attitude of the United States to this work. They are not embarking on this undertaking in the spirit of whether they can manage to make it "pay." I do not believe that is the spirit in which they are approaching this work. They find themselves in the world of to-day a great expansionist Power. They always have been expansionist, but they are to-day the greatest expansionist Power in the world. They find themselves carried into the whirlpool of world-politics—a force impossible to resist. They find themselves drawn down into the Caribbean, though they do not wish to go there. Do you think the United States want to take over the control of another six or eight million blacks? No, of course not! It is the last thing in the world they want to do, but they cannot help themselves. The United States, I believe, are going to make this canal, whatever it may cost. I was compelled to show you what the present condition of the canal project itself is (as regards the type and the time for completion), because on that hangs, to a large extent, the strategic results of the canal. You will understand that the present controversy as to whether it is at once to be a sea-level canal or merely a lock canal is of comparatively little importance—it must eventually be a sea-level passage from ocean to ocean. Whether it is completed in five or six years (as President Roosevelt says), in eight years (as Captain Gaunt informs us is the estimate of the chief engineer), or in ten to fifteen years (as I have suggested), the world will have changed in those years, and we have therefore to consider what the conditions will be at that time. As I said, I do not believe for a second that the Americans are approaching the building of this canal from the business point of view: whether it

may or may not pay. They are looking at it from a big standpoint, from the national point of view. The Americans are an imaginative people, and it does not require very much imagination, if you are an American, to be fired by the consideration of what the canal may mean to the United States. You must recollect that that enormous country, with all its wealth and all its potentialities, passes hardly a single vessel through the Suez Canal route to the Far East. She is, practically, cut off from the Far East. With the construction of the canal, the potentialities of the Far East (with its five hundred millions of people) and of undeveloped Australasia are open to America. Another factor is that she is getting a great competitor, not only economically but strategically, in Japan, and possibly one also in China. These things must fire the imagination of all Americans, and I believe will make them determined to see the canal built, whatever the cost. I have referred to three canal schemes. My own opinion is merely that of an outsider—a man who is no expert in these matters, although for the first fourteen years of my life I was an engineer, devoted a good deal of consideration to various schemes, and planned the railway connection of India and China. My support of the sea-level canal for Panama is based upon very good authority. I was influenced in coming to a decision by the fact that out of the Board of Consulting Engineers appointed by Mr. Roosevelt, no fewer than eight voted solidly for the sea-level canal, and gave weighty reasons against the lock canal which has since been adopted. Out of that majority of eight, five were among the most distinguished canal engineers to be found in Europe: Mr. Hunter (the British representative), Herr Tincauzer (Germany), M. Welcker (Holland), M. Quellenert (the Suez Canal), and M. Guérard (France). Not only did these engineers in Europe, whose opinion was worth having, favour the sea-level scheme, but three of the foremost American engineers also supported it. The lock canal plan adopted was only suppported by a minority of five—all American engineers. The question of canal dues has been raised by one or two speakers. I do not think that is of great importance to us to-day, because I think the Americans are going to make the canal irrespective of those questions. But, if you want to know something as to whether the canal will be used, and regarding the competition of the Tehuantepec Railway, I would like to quote a brief passage from a report by one of our Consular officials in Mexico. He quotes from Mr. John F. Wallace, formerly chief engineer of the Panama Canal, when giving evidence before the U.S. Senate Committee on Inter-Oceanic Canals. Regarding the advantages of the Tehuantepec over the Panama route, he said: "I do not think that you can over-appreciate the importance of protecting our future trade by heading off the possible development of the route by way of Tehuantepec. It goes without saying that it is much easier to hold a line of traffic than to get it away from somebody else after they get it once. I do not think that there are very many people that appreciate what the Tehuantepec route means if they get it established once." With regard to the question of rates and the possibility of large vessels paying heavy dues, Mr. Wallace said, in 1906: "The rates through all canals are on gross tonnage. Now, either Colon or Panama has got to be a distributing point for vessels up and down the west coast. It will not be economical for a vessel to leave New York and go to the Panama Canal and go down that west coast there. It will be economical for them to take cargo to Colon, for instance, that will fill the ship to the maximum and bring back cargo in the reverse direction. A large part of that freight will have to be transferred into ships of smaller tonnage in order to save these canal tolls. The result probably will be that a large portion of traffic will go across the Isthmus by rail

then, or it will be taken through the canal on lighters, very likely, in order to save this tonnage on immense steam-ships going through there and paying a tonnage charge back empty, or going through there half filled, or something of that sort. You will find that the commercial world will find out those things by practice and will adjust their business to them." That is the opinion of the most distinguished engineer yet connected with the Panama Canal. I do not bring this forward in the spirit of belittling the Panama Canal or exaggerating the importance of the Tehuantepec Railway. My own opinion is that the railway in the main serves a different purpose from the canal. It will compete, and may clash to a certain extent, but not seriously. I believe the railway will be amply justified by the enormous development in the Mississippi basin and by the local trade that will be developed. The work has been initiated as a great national undertaking for developing Mexico. I do not believe it will be a serious competitor to the Panama Canal, and I think there is ample room enough for both; the canal will stimulate the railway, and the railway will stimulate the canal. With regard to the time within which the work will be completed, Captain Gaunt said the chief engineer told him it would be completed in eight years. I think I read the other day that Mr. Roosevelt talked of five or six years. I can only tell you that the opinion of the engineers on the Consulting Board was not so sanguine. And the fact that the U.S. Government have not yet decided on the type of canal, and that they are now considering the location of the Gatun Dam and its method of construction, does not indicate a very early completion of the work. Then Mr. Basil Williams asked me a question about the "All Red" route, of which we have heard so much. I made no reference to this project, because it seems to me so far entirely in the air. At the very moment that we are abandoning our hold in that great focus of strategic power, the Caribbean, to seriously talk about establishing this "All Red" route across Canada is, I think, hardly practical. Personally, I think an "All Red" route, from the point of view of high policy, is a desirable thing and ought to be developed; but I do not think this country will consider the question from that point of view. I do not think it can be a competitor of the Panama Canal, just as I do not believe any of the Trans-Continental railways of the United States can successfully compete. You must remember the enormous distances they have to cover. They have discovered already that the amount of work they have on their hands is beyond their capacity, and in effect it is found that the handling of goods across the continent takes such an enormous time that a large portion of traffic must go to the Tehuantepec Railway and the Panama Canal. Then Admiral Bowden-Smith approved of our withdrawal from the Caribbean, and gave us advice which I do not think any of us require to take seriously: that we ought to keep on good terms with the United States. Yes, certainly keep on good terms. But why, in order to be friendly, should it be necessary to withdraw from a strong position, one which would make us extremely useful friends to the United States in a case of emergency? And why should we step out of the way at the very second when there is somebody else that is very anxious to replace us? I think there is a very pertinent reason for not doing as he suggests.

The CHAIRMAN (Major-General Sir T. Fraser, K.C.B., C.M.G.): — You all know that we are under a national obligation to Mr. Colquhoun for all he has written on many subjects. He is a traveller who has gone all over the world; he has been connected with great

affairs, with Governments, and with engineering; and he has kept his eyes open. I am sure you will all agree with me that he has given us an extremely interesting lecture this afternoon, and that our thanks are due to him for it. With regard to the discussion, my old brother officer, Major Paul, spoke with a great deal of authority on the subject, for he has lately been out in the West Indies in connection with it. Then, Admiral Sir Bowden-Smith, who, I am sorry to see, has had to leave, said that we cannot afford to send ships to the Caribbean Sea, *i.e.*, to Jamaica, etc. That is perfectly true. We cannot do so; but the reason is also perfectly clear. It is because the British Navy is now taking charge of the narrow seas and making itself entirely responsible for the defence of these islands. It is sound, strategically, to have the British Navy assembled in these waters, on the theory that it is the duty of the British Navy, and the British Navy alone, to defend these islands. But I differ entirely from the Admiral on that point. My view is that the defence of these islands against possible attack should be efficiently taken up, not only by the Navy, but by the people on shore; and until that is done I am convinced that our Navy is being tied, as the military correspondent of *The Times* rather light-heartedly said, like a goat to a peg, in the task of simply defending these narrow seas, when they have the whole world they ought to look after. I may say that the lecturer and myself had the honour of discussing this question with Mr. Roosevelt, the President of the United States, and I am entirely with Mr. Colquhoun in all he has said on the subject. There is only one little interesting point as regards the sea-level canal that I might mention. The difficulty is that there is one hill, one section of earth 450 feet high, which has to be cut through. It is a very big engineering undertaking, but it is not impossible. The whole engineering opinion of the United States and of this country is, I think, that the sea canal is the best: but it was quite clear to me that Mr. Roosevelt was looking very anxiously at the East, at the development of Japan, and the position of affairs in the Philippines. He naturally feels a deep anxiety to make this passage through, somehow or other, and soon, so as to double the potentialities of the fleet. The great commercial advantages of connecting the West of the United States to the East, and *vice versa*, are apparent to every one. Besides that, I think there is an internal political question involved. You recollect that in the sixties the possibilities of the separation of North from South gave a great deal of trouble to the country. I think the North was perfectly right in maintaining the union; though I sympathise warmly with the South, who fought one of the most gallant wars that was ever fought in the world. Now, I think there is possibly a danger in that great community of a separation of interests, not on a line of latitude, but on a line of longitude. President Roosevelt, as a statesman of far-seeing views, naturally desires to be able to communicate from East to West, and West to East, both commercially and with the very powerful Navy that the United States has now created. As regards ourselves, it is quite clear that the canal will put the United States in a more predominant position in both North and South America. We may be thankful that it is a race of our own blood that is going to have that important and distinguished position; but I think we ought, as the lecturer says, to hold on to our islands in the Caribbean Sea, if for no other reason than that they will ultimately come in as an appanage and a source of trade with Canada. The principle laid down by a distinguished lady, who made a great name for political wisdom, is sound, viz.: "Never give away anything." I sincerely hope we shall never give away anything, gracefully or otherwise, in the Caribbean Sea, and that we shall everywhere hold to all we have got.

MOBILITY: ITS INFLUENCE ON STRATEGY.

By Colonel F. N. MAUDE, C.B., Hampshire R.E. (Vols.), late R.E.

On Wednesday, 20th March, 1907.

General Sir J. D. P. FRENCH, G.C.V.O., K.C.B., K.C.M.G., in the Chair.

THE one abiding lesson to be deduced from the study of the South African Campaign is, the overwhelming importance attaching to the factor of "mobility" in determining the duration of the struggle. In every other respect, armament, discipline, organisation, and training, our troops were at least equal and, in general, superior to their antagonists; but because the latter could move in round numbers three times as fast as we could, it took us nearly a ten to one numerical superiority to force them to submission. Take away this superiority in mobility and, I think, it is quite safe to assert that the war would have lasted only as many months as it did years.

As the war progressed, I was so much struck with the hopelessness of the task confronting our generals—assuming that the Boers were able to utilise to the full the advantage conferred upon them by their mobility—that I went over the principal campaigns of history to determine specifically the share mobility played in the decision of each.

The result is indicated in the diagram A, which I will now briefly explain.

It will be noticed at once that the war in the Netherlands dragged on for years with no decisive results. Both sides were about equal in mobility, which was of a very low order, owing to the inordinate weight of the equipment each, following the custom of the times, considered it necessary to drag after him.

This was largely due to the number of fortresses which had to be reduced, and the fortresses in turn derived their importance from the geological nature of the country, a clayey loam, which made movement off the roads or by country tracks almost impossible.

The wars of Frederick the Great's day show a marked improvement. Though the general poverty of the country compelled both sides to rely essentially on magazine supply—this poverty was mainly due to the sandy nature of the soil—which, draining rapidly, made it possible for Armies to manœuvre, if not to march, freely about the country.

But for the enormous numerical preponderance of his enemies, many of Frederick's victories would have been decisive in the fullest sense, though the ultimate results might not have been so overwhelming as in those of Napoleon.[1]

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[1] See on this point a chapter of exceptional interest in "Geist und Haft im Kriegs," by C. von B. K. Vienna.

The latter, however, found the surface of Europe almost transformed when he commenced his career of victory. Owing to the growth of population, agriculture, and industry generally, during the comparatively long spell of peace, all the Continent, except Prussia, had enjoyed, a network of great chaussées, usually paved, had spread all over the country, and agriculture having drained much of the land, armies could now not only manœuvre, but march freely in every direction.

The increase in crops and live stock further made it possible for the French to feed their forces by requisition, and thus reduce their provision trains to the barest possible limits, an example their opponents found it "inexpedient" to follow. The result is clearly indicated by the zigzag appearance of the curve between 1800 and 1815.

The remainder may be briefly summarised:—

Crimea.—Manœuvres impossible, decisive battles nil.

1859.—Both French and Austrians had lost their mobility; battles indecisive.

1862-4, America.—Country for the most part roadless and undrained; impediments on the northern side enormous. War protracted and battles indecisive.

1866.—Country fair; mobility of Prussians relatively good. Campaign lasted seven weeks.

1870.—Country cultivated; communications numerous and good. Mobility of the Prussians relatively high. Battles numerous and decisive at each phase of the campaign.

1878-9, Bulgaria.—Country undrained and mountainous. Communications very inferior; mobility on both sides low. Result: battles indecisive.

1905, Manchuria.—Communications indifferent; movements slow; battles indecisive.

This diagram, therefore, shows a clear connection between the general development of the theatre of war and the duration of the campaigns. Also on the tactics forced upon the combatants in each, for wherever we come upon an undeveloped country we find a recrudescence of field fortification, and an absence of great decisive battles in the open field.

The next point to open up is, what is it really which constitutes mobility? For in any one of the campaigns in which mobility played the principal part, the actual marching rate per hour of each respective arm must have been very nearly equal. There is no evidence to prove that, say, in the Marengo Campaign, an Austrian long service battalion could not have kept up with a French one, though latterly, indeed, the French undoubtedly could outmarch any troops in Europe.

To elucidate this, it is necessary to break up the general idea of mobility into its several constituent factors, and broadly we can at once distinguish between "collective" and "individual" mobility, using the former term to indicate the potential mobility of the army as a whole, the latter the rate of movement of the ultimate units, squadron, battery, company, and finally of the individual man.

The "collective" mobility, again, may be split up into the following subheads:—

1. *The character of the commanders.* If a general knows his own mind with such certainty that, like Napoleon, he can, within

an hour from the receipt of his outpost reports, dictate the orders necessary to set some 200,000 men in motion, it is clear that he gains enormously over one who changes his plan and hesitates with each fresh rumour approaching him. This, of course, is largely an affair of character, but it is susceptible of immense development by a sound grounding in the Art of War as a whole, and practice in the conduct of strategical war games, which habituate the mind to grasp the essentials and neglect side issues.

The question, then, arises: What is a sound grounding? and the answer will be found if we contrast the different methods pursued by Napoleon from 1806 to 1815, and by Moltke in 1870. The former had realised in practice long before Clausewitz wrote, that in war the *independent will-power* of the adversary is the principal factor of uncertainty, and had devised a sound strategical method to paralyse his enemy's independent will.

The diagram shows the essential difference. Napoleon marched his armies, covered by a strong *avant garde générale*, capable of attacking vigorously and *fixing* his adversary, and about the point thus *fixed* he then manœuvred his masses, with results sufficiently apparent at Jena, Friedland, Lützen, and Dresden. It mattered not to him what the enemy was intending to do; the attack of his advance guard paralysed his opponents' will-power, and the "mass of manœuvre" decided the outcome. All he required was punctuality in his subordinates, and a readiness to die for their country in his men. Moltke, on the other hand, had never grasped the principle involved in this *avant garde générale;* he relied essentially on a cavalry screen which could only observe, not hold, and the situations from 6th August to the 18th show the insufficiency of his design.

Moltke reasoned out on insufficient and unreliable *data* what the enemy ought to do, but ignored the possibility of his making grave mistakes, as, for instance, on the 11th, 16th, and 18th August. Napoleon knew that the enemy might perpetrate blunders too wild for his own mind to conceive, and by attacking him rendered him immobile and incapable of any form of mischief.

Fundamentally, therefore, I should recommend that the Napoleonic method should form the basis of our instruction, and would suggest that the circulation of the works of the French General Staff, specifically those of General Bonnal and Colonel Foch, should form the first care of our Military History section when we get one.

2. Next in importance comes the preparation and circulation of orders to give effect to the Commander-in-Chief's decision. Primarily his staff must see the problem with his eyes, so that a mere phrase is sufficient to enable them to act upon; and, equally, each rank of the Army in succession needs to be tuned to receive the intended impression.

It was this faculty developed in the French Army which, together with its organisation in Corps and Divisions, gave it its enormous excess of mobility over the Austrians in 1805. The Austrians also were, on paper, organised in Corps and Divisions, but these were mere aggregates of battalions liable to constant change, and not an organic whole, each with its own staff and machinery for the circulation of intelligence. Battalion orders were still drafted by Army Headquarters, and on the morning of Elchingen—practically the decisive day in the Ulm campaign—Mack excused himself for his delay in moving to the support of Guilay by stating in his report

to the Emperor that at the moment the news of the French attack arrived he was so busy in writing the orders for his projected move—which necessitated 14 pages of foolscap, and did not contain a superfluous word —that he had no time to give the news the attention it deserved.[1]

Fortunately this difficulty with us has long since been removed, and I look upon the institution of the examinations in (*c*) and (*d*) as by far the most important steps towards efficiency with economy that have as yet been taken.

The essence of these examinations is, that not only do they afford a means of selecting those who show talent in the appreciation of situations and the issue of orders, and to excel in this certainly does require talent, but it ensures that every rank throughout the Army becomes saturated with a knowledge of the conditions and limitations under which of necessity orders in the field have to be prepared, and this constitutes the very best guarantee for their loyal execution, which, again, implies promptitude and an increase of mobility.

3. Lastly, under this head comes the organisation of the Army itself in units of such size that they can in any given district make the best use of the network of roads available.

The problem in Western Europe is to secure that every road should carry the maximum number of combatants possible, and experience has abundantly demonstrated that the Army Corps best fulfils this condition. The attempt to work by Divisions made in Prince Frederic Charles' Army in 1866 broke down badly.[2] In India and Japan things are very different; but we may have to fight nearer home, and quite apart from the use of the roads, in the numerically enormous Armies of the present day, an intermediate link between the Army and the Division is a necessity.

We come now to the question of "individual" mobility. Setting aside for the moment the question of the weights to be carried, the mobility of a unit depends essentially on the "collective will power" of that unit, which in turn depends on the spirit of its training, the physique of the men, and ultimately on the health of each individual in the ranks, the four being so closely interwoven that it is difficult to arrange them in definite order.

Health, however, must be the starting point of the whole erection, for without health there can be but little will, and consequently no "collective will power," which is only another word for "discipline."

To us in England this question of health possesses a transcendant value, for no troops are exposed to such climatic vicissitudes as ours.

Briefly stated, a good digestion is the best antidote to all fevers and infectious diseases yet discovered. Good digestion means healthy blood, and if the blood is healthy, then any intruding bacillus receives but a very short shrift.

The first and greatest enemy of digestion is the sun. Those who have suffered from it will need no technical demonstration of the fact. It will be sufficient to state that excess of actinic rays produces certain disturbances in the great nerve centres, running

[1]See introduction to "La Campagne de 1805." Alembert et Colin. Paris.

[2]See Bonnal's "Sadowa."

down the spinal column, which react upon the stomach, and renders it more or less incapable of performing its proper functions. But as every photographer knows, the actinic rays can be filtered out by using a screen of suitable colour—anything in the colour prism between yellow and dark red. And acting on this idea some 25 years ago in India, I found that by lining one's hat and coat with any material of the proper colour I could render myself quite immune even to the sun of Scinde.

Ever since I have been endeavouring to get the idea taken up and practically applied in the Army; but though I am informed that the proposal now has the full support of the medical authorities —indeed has been warmly urged by several of them—no steps whatever have been as yet initiated, though the economy in men's lives and in invaliding can be shown to be some thousands a year, quite apart from the indirect gain in increased efficiency in marching power.

I hesitate to give expression to the explanations which some of my medical and scientific friends have given to account for the extraordinary supineness of the authorities in this matter; possibly the initial cost of the lining to hat and coat may have something to do with it—about 2d. a head; but if that is the case, then, I suggest that no lining is necessary at all. The men must have shirts, and a red shirt would cost no more than a grey one. More probably the cause is really the want of scientific education in youth, which prevents men of mature mind realising that there are such things as invisible rays in the spectra capable of extraordinary influence on human nerves.

Assuming, however, that this suggestion is ultimately adopted, the next great enemy the digestion has to encounter is fatigue—when pushed to the limits that the prolonged marching indispensable in modern operations exacts. The body, then, has absolutely no energy left to digest anything but the lightest foods, yet the only stuff we have to offer it is "beef on the hoof"—stringy and hopelessly tough—or tinned cooked meats of varying degrees of indigestibility, and all alike quite devoid of nutritive properties.

This latter deficiency is due to the fact that all these foods have been cooked before they are sealed up. Chemically they still seem to possess the same proportions of proteids, etc., as when raw; but under the microscope they show a very marked difference, which increases from month to month under the influence of the invisible rays transmitted to them through their metal envelopes. (Cordite cartridges—indeed, all chemical powders—deteriorate in the same way.)

Tin—or metal generally—is an absolutely essential covering to all foods for use in the field, simply because nothing else will stand the knocking about; but no food, whether cooked or raw, if put up with any moisture about it, can be relied on to keep even wholesome, let alone palatable, in tin cases.

The only solution of the difficulty is to put up the food absolutely dry—like grain, for instance—and raw if possible, for only in that condition will it retain its full nutritive qualities. This problem has at length, after twenty years of experiment, been successfully solved by a British officer, and there is every prospect that for many years to come, we shall enjoy an enormous advantage under this head over all our possible enemies.

These foods—for he has treated all kinds—have these additional advantages over all others, viz., that they not only retain their full flavour and aroma, but can be eaten raw, half cooked, or fully cooked, and are, if anything, more digestible in the first than in the last case.

For men in the firing line, unable to think of cooking, they are quite ideal; but I would suggest that before any definite type is adopted, experiments should be made by adding to them any one of half a dozen convenient drugs, which, whilst not altering the flavour, would increase the proportion of nerve foods in their composition, and thus supply the tremendous drain on the nervous energy involved by the noise and excitement fighting necessarily entails.

Unquestionably, however, the best way of administering food to completely exhausted men is in the shape of a hot broth, and this end can easily be obtained by the adoption of the Siberian field kitchen, which is simply a tank surrounded by any non-conductor, such as felt, and mounted on wheels.

To cook the rations above alluded to, all that is necessary is to put in the food, fill up with boiling water, and let the mixture simmer, whilst the troop is on the march.

This seems to me a far more favourable use of transport than any of the suggestions for sterilising apparatus for water, which have been so freely put forward since the Boer War, for much of the water needed is thus carried in the food itself, and as for the remainder which a man needs to drink, if his digestion is sound, he can drink even unsterilised water with impunity.

To complete this food question I will here add that by the use of the same preparations I have been able to devise an emergency ration for horses, which can be given to them during short halts and under conditions of great exhaustion, and that, taking the cost of transport for men's rations alone, during our campaigns of the last thirty years, I have calculated that the direct saving would have amounted to about half-a-million sterling per annum, whilst the indirect savings, due to increased efficiency and diminution of the sick lists, would far exceed the above sum.

Further, had the Russians used them during the Manchurian war, the saving of railway transport would have enabled them to put at least 50,000 additional rifles in line at Liao-yang, with consequences which must have proved very far reaching. It would be interesting also to work out in detail the results in many situations in South Africa, if our mounted columns could have been sent out for a whole week carrying only 8 lbs. dead weight of forage and food for the rider.

It is not merely the extra muscular power, which is evolved by sufficient and suitable food, that has to be considered, but the increase of nervous energy or will power which remains available, and can be maintained in the troops already in the fighting line.

In the vast majority of cases, it is this nervous energy which gives way first, long before the actual physical strength of the men is exhausted. This is proved by the pace at which nervously-exhausted, and, therefore, panic-stricken troops can cover the ground in flight; but it is a point which has hitherto never received the attention it deserves, probably because the period of duration of the nervous strain, if more intense while it lasted—on the battle-fields of the past—was very much shorter, and even such a very crude

expedient as alcohol might meet the case; but nowadays, when a great battle can hardly last less than two days, and may last two weeks, this question of providing the man with the means of making good the principal element of waste, deserves the closest attention. We feed our race-horses on oats, to enable them to make good the waste of nervous tissue. Surely we can apply equal observation and attention to our men.

This food question is so vital that I would strongly urge the Government to acquire the secret of its preparation, for not only does it apply to troops, but to the whole problem of food supply in war time for the people of this country.

One cubic foot contains 1,000 rations; therefore a vessel of the "Cedric" or "Celtic" type, capable of carrying 20,000 tons of cargo, would convey in a single trip 40 × 1,000 × 20,000 rations, or 800 million rations = 20 days' food for 40 million people, allowing full rations of meat and vegetables even to infants in arms.

The Government manufacture their own biscuits, etc., at the Clarence Yard, Gosport, and elsewhere; why not extend the principle and manufacture meat rations in Canada where meat is cheap?

But in spite of Royal Commissions, no one as yet appears to have realised the terrible situation of these islands, if, when war is declared or commenced, our arrangements for feeding the people are not ready to be applied at a moment's notice. There is the sure and certain gold panic and rush on the banks, entailing the ruin of thousands and hundreds of thousands due to the complete breakdown of credit.

Securities of all sorts will fall, not because they will alter in intrinsic value, but because there will be no gold to measure that value in, and the only thing that is absolutely certain to rise in gold value is "food."

What will happen to people of fixed incomes when the source of most of their incomes dries up and food is at famine prices? The most pitiful cases of all seem to me to be those who have sunk their savings for life in insurance offices in the vain hope that whatever happened to them, their wives and children would be secure. But insurance offices will be amongst the first to go, for they will have to meet a double strain—depreciation of securities and increased death-rate.

On the minor details of reducing the actual weight carried by man and horse, I have written so fully and so frequently that I need not weary your attention. The whole matter can be summed up in a sentence: "It costs less to supply a new saddle than a new horse," and it would be cheaper also to serve out a complete kit once a week than to replace men broken down by the extra weight of a useless pack. These things had their justification once, in the bottomless mud of the Netherlands, for instance; but in these days of the motor lorry and traction engine, we can get along very well without them.

There remains, then, only the question of ammunition and entrenching tools to be considered.

The whole essence of tactics lies now, and always has lain, in the placing of one's troops in such a position relative to the enemy that they can destroy and break down his power of resistance more rapidly than he can break down yours.

The accompanying diagram shows at a glance the manner in which improvements in range and power of armaments have, by degrees, facilitated this task for the assailant.

It will be seen that in the days of the battering ram, the assailant was exposed to fire from both flanks and from above; in the days of the bastion trace, the breaching batteries were still in equally hard case, and surprise and concealment were both out of the question, whereas nowadays, it is the point of attack that is threatened on all sides, and concealment and surprise are both transferred to the assailant.

The same sequence is also apparent on the battle-field. In the early days of the musket, at most only a couple of hundred muskets could combine a fire of one round every two minutes, upon any given flank, and even in the Napoleonic time, his "*batterie de brêche*" could not be brought up to bear on the enemy's line, until the latter's fire power had been beaten down by a long continued fire action, in which the will power of the defenders was ultimately exhausted, and even then its really effective power depended mainly upon the accident of a convenient saddle or roll in the ground not more than 500, or less than 300 yards from the enemy's line (*vide* Waterloo). But nowadays it has become possible, by pre-arrangement, to concentrate the fire of many thousands of rifles and many hundreds of guns on any selected point from hollows and folds in the country over an area of many square miles.

Now, the denser the hail of bullets delivered, the shorter the time in which the given degree of destruction required can be executed, and the greater the number of weapons employed, the fewer the rounds that each individual weapon requires to fire.

Further, the more rapidly a given percentage of loss is inflicted, the less total loss is required to produce the requisite degree of demoralisation in the enemy's ranks. It is well known that troops, staunch enough to bear up against a punishment of 30 per cent. in a whole day's fighting, may be completely broken up by 5 per cent. of casualties inflicted in 5 minutes.

Therefore, it follows that if a sufficient degree of mobility can be attained by shedding weight to enable a general to place his troops in the relatively best positions against their enemy, *i.e.*, to give his men a target they cannot miss, then far fewer rounds need to be carried, and entrenching tools can safely be laid behind.

The extreme case, of course, occurs in the case of fast moving cavalry against relatively slow mounted infantry—the latter will always end by being "rounded up" about their led horses, and for given effectives, say about 2,000 mounted infantry against an equal number of cavalry, it can be shown by calculation that every bullet fired by the latter stands a 20-fold better chance of finding a billet than those fired from the centre towards the circumference.

This idea, of course, must not be pushed to its extreme limits, the circumstance under which troops may come into collision differ so widely that considerable allowance must of necessity be made; but I bring the point forward as a protest against the marked tendency there has been, since the South African War, in the Army to cry out for an increase in the very weights which lay at the root of our troubles.

We suffered punishment because we were slow, and now we clamour for more ammunition, entrenching tools, heavier artillery,

etc., which would all make us slower, and the need for which would never have been felt had we been able to outpace our opponents.

In European warfare the future belongs to that army which resolutely focuses its principal efforts on securing in all arms the utmost possible mobility, not only by the adoption of a sound system of strategic instruction and attention to staff duties, as set forth above, but by lightening to the utmost ounce the weights carried or dragged by men or horses when in contact with the enemy, loading up everything which can be dispensed with for a few days at a time, on motor transports of various sorts, fast, medium, and slow. The shortening of the column of route, which would result by the elimination of all horses, at present employed for transport service, would almost double the rapidity of concentration for battle, and I cannot conceive of a single article at present carried in our innumerable store carts, ambulances, etc., which troops cannot very well dispense with for forty-eight hours.

I would suggest, as an interesting study for our next war game season, to work out a number of cases in which a highly mobile force is opposed by a more numerous, but slower enemy, and from the comparison of a number of results we might obtain some invaluable data. I have tried the experiment in several instances, allowing the infantry of one side to march at the rate of the Bersaglieri and French Chasseurs against the normal speed, and have always found that the sudden appearance of the former, far in advance of where the latter expected the meeting, has demoralised the opposing commander altogether.

Captain C. SLACK:—I should like to ask one question with reference to the emergency rations. Were they not tried in the South African War, and was it not the fact that, although they were sustaining to a certain extent, they lacked filling properties, that is to say a man never felt he had a good meal? To put it to the test, should not these emergency rations be tried in peace times? Would it be fair to try men on them for a week, because that would show the value of these emergency rations?

Colonel H. B. JEFFREYS, C.B.:— I think the lecturer has opened a very interesting train of thought to us by means of his diagrams on the influence of mobility in attack and defence, and I only regret he did not carry his enquiries into the historical question somewhat further on that line of thought. As regards what he did say, I should like to make two remarks. I do not think Napoleon intended Davout at Auerstädt to blunder right against the main Prussian Army; I think it was rather an accident. He ran a far greater risk than he intended to take, and there was a very great chance of Davout's army being destroyed while Napoleon was winning his own battle at Jena. There is another matter as regards the mobility of the Boers that has not been touched on by the lecturer, in regard to the great difficulties we experienced in bringing them to book. I think there was another factor in that case which was of even more importance than mobility, namely, that the Boer towns were of no value. The Boers would not stand and fight for any particular locality except in Natal. There they had some fair and square fighting, but as soon as our Army was working on proper lines they had no difficulty in breaking through the Boer defences. The enquiry into the food supply of the United Kingdom was perhaps rather beyond the scope of the subject of the lecture. I think most of us would hardly go so far as to agree with

the lecturer in his views of our extreme danger from starvation. I think it is impossible, in these days of fast steamers, to cut off the food supply of the United Kingdom, though undoubtedly in case of a big war against us by a combination of Powers the price of food would go up enormously; and it would then be the business of the Government, at whatever sacrifice, to ensure food being sold at a reasonable price to the inhabitants. The question of why we did not use the emergency rations more has been raised. The reason is a very simple one, that in South Africa we had an emergency ration, but after we ate it there was not another to replace it. It could be used for one hungry day only and no more.

Colonel Lord LONGFORD:—May I ask the lecturer whether the emergency horse ration has been practically tried?

Colonel MAUDE:—It is being tried now.

Colonel Lord LONGFORD:—With entirely satisfactory results?

Colonel MAUDE:—As far as they go.

Colonel Lord LONGFORD:—If that is so, it would solve every difficulty that we have.

Lieut.-Colonel A. DUNCAN, I.M.S. (retired):—I should like to say a few words with regard to the question of sunstroke. Perhaps you will pardon me being egotistical; but I received a severe attack of sunstroke during the Afghan War, for which I had two years' leave. I had no sooner gone out to India again before I had a second attack, and in the succeeding hot weathers I used to suffer from intense headaches. My third attack was in the Black Mountain Campaign, for which I had another two years' leave. On going back to India again, I read an article one morning in the mess, signed by "An Executive Officer," whom I subsequently found was Colonel Maude, in which he described the good effects of lining the helmet with red. I immediately adopted this manœuvre, and during the rest of my service in India, I never felt the sun in the slightest degree. I used to wear a red shirt; I had a red lining down the spine of my back; my helmet was lined with red, and I was perfectly free from any feeling of malaise in the sun. Since I have retired from the Service several patients have consulted me with regard to what they should wear for preventing sun effects. I have always advised them to use red lining, and from subsequent enquiries I have found they have always been perfectly free from any effects of the sun. So that I am perfectly certain from my own experience, and the experience of others, that Colonel Maude's suggestions in that direction are right, because I formerly used to wear various kinds of helmet, sun spectacles, etc., without the slightest effect. The actinic theory of sunstroke is the correct one.

Colonel F. N. MAUDE, in reply, said:—I have only a very few questions to answer. With regard to the emergency rations, those that I have exhibited here to-day were not tried in South Africa. I know that none of the types served out in South Africa were satisfactory, and that is the reason why these were made. The new emergency rations will be issued to the troops to be experimented with shortly, so that we shall know more about the subject presently. They have, however, from my own knowledge, stood any amount of travel. As regards the question raised by Colonel Jeffreys about Davout and Jena, that was so. The point rather is that it showed the strength of Napoleon's formation. If his advanced guard, as it happened in that case, fell on the bulk of the army instead of only

part of it, at any rate, Davout could not have been destroyed in less than something like twenty-four hours' fighting, and whilst he was being destroyed, Napoleon was destroying the other wing. In was part of the principle, and everything worked out correctly. The beauty of the thing was that the Prussians, the very afternoon they heard of the mere threat of the appearance of that advanced guard, proceeded to separate their armies into two divergent parts and to offer them up to destruction in two sections, part to Davout and part to Napoleon. Whatever happened to Napoleon, he was ready for the danger wherever it came from. With his "battalion square" of 200,000 men he marched through it all. I quite agree with what Colonel Jeffreys said about South Africa, which is mainly open country, where there are no towns and no points which you can compel the enemy to hold. If you have something in the nature of a city or towns which fixes the enemy, well and good: but the Boers had an irregular, broad veldt, over which they could rove pretty well as they pleased, and with no means of communication to trouble themselves about.

The CHAIRMAN (General Sir J. D. P. FRENCH):—I suppose there is no subject which demands greater attention, on the part of soldiers, than that which has been chosen by the lecturer, and so ably dealt with by him. Whether in the *rôle* of strategy or in the sphere of tactics, the side which possesses superior mobility, in the hands of a commander who takes that mobility into account, must in future, spell success; and it is needless to emphasise the fact that the larger the force and the greater extent of ground embraced by any particular set of operations, the more, a thousandfold, will this great attribute make itself felt. In the latter part of his remarks Colonel Maude has mentioned the action of fast moving cavalry against relatively slow mounted infantry as an instance of the great power of mobility; and he has described this as an extreme case. I do not think it is necessary to take an extreme case as an illustration of this great principle. In a theatre of war we find obstacles abounding in every direction in the shape of river lines and, sometimes, mountain ranges. No one who has given any heed to the study of how to deal with such obstacles can fail to understand the enormous value which superior mobility will be to that side which possesses it, and it has been only by the power of mobility that the great captains of history have effected those wonderful strategical strokes and those lightning movements which have decided the fate of many a campaign. If we come to the field of battle a very simple illustration of the value of mobility is to be found in that form of tactics which so often led the Duke of Wellington to victory, that which is known as the offensive defensive, wherein the launching of a powerful counter-attack decides the day. The point whence the counter-attack can best be launched can only really be known when the enemy's attack is developed, and then the one essential is to move with the utmost rapidity to that point. But when we come to think of the extent of battle-fields in these days, twenty, thirty, or forty miles, and sometimes more, where are we to post the force with which we intend to make the counter-attack? If we post it in the centre, how can it possibly, without the utmost mobility, get to the decisive point at the right moment? It is these almost every-day instances in the practice of strategy and tactics which show us so clearly the immensely increased value of mobility. I wish to say one word on the parallel which has been drawn by the lecturer between Napoleon and von Moltke. I do not think we are quite justified in saying that Moltke had never grasped Napoleonic principles. It is to be remembered that his work was done under totally different political conditions to those which governed the work of Napoleon, and that the employment of the

"avant garde générale" in the strategic deployment of the armies of to-day would involve a far greater risk than that incurred by Napoleon, although, as history several times tells us, the risk was by no means absent even in his time. I should like to emphasise, in the strongest possible manner, the remarks of the lecturer on the subject of collective mobility, and particularly when he talks of the necessity for penetrating, and, if possible, paralysing the independent will-power of the adversary. This, in fact, is what we mean, in its fullest sense, when we talk of "moral power" and "moral effect" in war. This great principle is brought out so well by the late Colonel Henderson in his "Science of War," that I cannot forbear quoting one short passage, which will emphasise and illustrate the lecturer's meaning far more than any words of mine could do: "War is more of a struggle between two human intelligences than between two masses of armed men. The great general looks beyond his own troops and across the enemy's lines until he comes to the quarters occupied by the enemy's leader, and then he puts himself in that leader's place, and with that leader's eyes and mind he looks at the situation; he realises his weaknesses, the points for the security of which he is most apprehensive; he considers what his enemy's action will be if he is attacked here or threatened there, and he sees for himself, looking at things with the enemy's eyes, whether or no apparent risks are not absolutely safe. "It is to be ignorant and blind," wrote the German biographer of Hannibal, "in the science of commanding armies, to think that a general has anything more important to do than to apply himself to learning the inclinations and character of his adversary."" I agree entirely with all the lecturer has said as regards individual mobility, and the necessity for reducing the weight carried by the man and horse. The question of rations and forage does require a great deal of threshing out; but the subject has engaged the lecturer's attention, I know, for many years now, and I think I am right in saying that some of his experiments are now under trial at the War Office. There is one point I do not quite understand about the rations and forage he has referred to to-day. Do they expand on being treated like our own rations?

Colonel MAUDE:—Yes.

The CHAIRMAN:—That is to say, you can pull a small thing out of your pocket and make a beefsteak out of it.

Colonel MAUDE:—Certainly.

The CHAIRMAN:—I do not think you have brought that out quite clearly in the lecture. I do not think the tendency has lately been to increase weights, in fact I know a great deal has been done in the other direction. Since the close of the South African War, we have all, I think, been very much alive to the necessity of relieving both the man and the horse of the weights they carry, and we have gone a great way in that direction. It is a point that requires very careful watching, and I am sure will always receive our utmost attention. There was one very interesting point which Colonel Jeffreys brought out with regard to Napoleon. The great lesson to be learned from that is that Napoleon was really strong at the decisive point, *i.e.*, Jena; and although it was better for him that Davout should have been successful than that he should have been defeated; still, had Davout been defeated it would have only meant defeat, whereas had Napoleon been defeated it would have meant absolute disaster. I am sure I am only expressing what you all feel when I say how very grateful we are to Colonel Maude for his most interesting and instructive lecture; and I beg accordingly to move a hearty vote of thanks to him for it.

WARS OF THE TURKS WITH THE GERMANS.

By Lieut.-General F. H. TYRRELL, late Indian Army.

Continued from January JOURNAL, p. 63, and concluded.

THE FIFTH WAR.

THE Turks never ceased to dream of revenge, and to scheme for the recovery of their lost provinces.

The Sultan Ahmad III., when hunting in a forest near Constantinople had happened to notice a handsome child, the son of a charcoal burner (Kumurji), and finding the lad's wit and intelligence equal to his beauty, took him into his own service as a page; he continued to merit his Imperial master's favour, and was promoted to be his armour-bearer, a post of high dignity in the military household of the successors of Othman. He afterwards married the Sultan's daughter, whence he is generally called Damad Ali (Son-in law Ali) by the Turkish historians, though better known by his *sobriquet* of Kumurji to European writers. While still a youth he was appointed to the post of Grand Vazir, "the dauntless Vizier" of Byron's "Siege of Corinth."[1] He was a young man of great courage and unbounded ambition, and it was his fixed determination to recover the lost possessions of the House of Othman and the Caliphate of Islam. As soon as he was appointed Vazir he set about making great preparations for war, and assembled a large army and a formidable fleet in the spring of 1715 for the invasion of the Morea. The Venetian Ambassador at the Porte was thrown into prison, and war was declared against the Republic. The Venetians had no time to hire troops and generals from Germany and Switzerland; their own forces in the Morea were inadequate in quantity and indifferent in quality; and the Greek Militia, which they had trained to arms, could not be induced to face the Turks in the field. Damad Ali over-ran the Morea and reduced all its fortresses in one campaign. The Signoria had applied for aid to the Emperor as a signatory of the Treaty of Carlowitz, and he, knowing well that the next object of the Turkish armaments would be Hungary, forestalled them by a declaration of war. The Pope gave his blessing to the enterprise, and an Imperialist army, 50,000 strong, was assembled in Hungary and placed under the command of Prince Eugene.

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[1] "Coumourgi, he whose closing scene
Adorned the Triumph of Eugene;
When on Carlowitz' bloody plain,
The last and mightiest of the slain,
He sank, regretting not to die,
But cursed the Christian's victory."
—*Siege of Corinth.*

In the spring of 1716 the Grand Vazir again took the field at the head of an army of 150,000 men, of whom 30,000 were Sipahis and 40,000 Janissaries, with 300 guns. Another army, 30,000 strong, under the Seraskier, Kara Mustafa Pasha, was assembled on the Albanian shore, whence it was transported to the island of Corfu by the Turkish fleet under the command of the Capitan Pasha, Janum Khoja, and the two jointly besieged the fortress of Corfu. But the Venetians had garrisoned it with some hired German troops, and had engaged the Saxon Field-Marshal, Schulemberg, whose skilful tactics had once baffled Charles XII. of Sweden in his Polish campaign, to defend the city. The Grand Vazir mustered his army at Belgrade, crossed the Save, and marched on Peterwardein. Eugene advanced to meet him at the head of an army mustering 187 squadrons and 62 battalions. Ali Kumurji was informed that his adversary, Prince Eugene, was a great general. "Then," replied he, "I shall become a greater, and at his expense." The first encounter between the hostile armies encouraged his hopes: the cavalries of the two advanced guards came into contact in a broken and wooded country, most favourable to the tactics of the Turks, and the Germans, who were far inferior in numbers, were defeated with dreadful slaughter. General Bremner and many others were made prisoners. The Grand Vazir was greatly elated by this partial success, and hastened forward to encounter the German main army, which he found encamped on the great plain of Carlowitz hard by Peterwardein. The two armies faced each other in the same positions which Prince Eugene and Sultan Mustafa had occupied twenty years before. The Vazir commenced making regular approaches, apparently with the intention of advancing under cover to the attack of the German camp; but the Prince forestalled him by leading out his troops on the morning of the 5th August to attack the Ottomans in their trenches. The German Army was in the usual formation of two lines and a reserve in third line, the infantry in the centre, and the cavalry on the flanks, and was divided into two wings. The Turks opened a furious cannonade all along the line, and the Austrian artillery, being quite overmatched, Eugene, like Wellington at Assaye, ordered an advance with the bayonet. The Prince of Württemberg at the head of the left wing drove the Turks before him; but the right wing was thrown into confusion in crossing the Turkish trenches by a desperate charge of the Janissaries, who rushed to the attack, sword in hand, like the Highlanders at Prestonpans, and broke through the first line. The mob of charging Turks and flying Germans was precipitated upon the second line, and broke through that also. The Turkish scimitar made fearful havoc in the Christian ranks; the two Generals, Lanken and Wallenstein, who commanded on that wing, were both killed, and the fate of the battle hung in the balance. But Eugene brought up his reserve, and Count Palffy, who commanded the cavalry of the right wing, wheeled his squadrons inwards and came down with 2,000 horsemen at full gallop on the flank and rear of the victorious Janissaries. The wild fury of the Turks was exchanged for wilder panic; they fled on all sides, and were cut down and trampled down by the cavalry. The Germans were rallied, and their lines rapidly re-formed; the Vazir was endeavouring to rally his flying troops, when he was struck down mortally wounded by an Austrian bullet. His officers carried him from the field; the news of his fall spread dismay through his army, the Germans were pressing them vigorously in front, and

the cannon of Peterwardein were thundering on their flank. The whole Turkish host took to flight, abandoning their camp, baggage, stores, a hundred and fifty standards, five horsetails, and two hundred and fifty pieces of cannon. The battle had lasted five hours, and the Turkish loss was computed at 30,000 men killed and prisoners.

The Grand Vazir, Damad Ali Kumurji, died of his wounds shortly after the battle. His last moments must have been bitter ones. His last words were an order to kill General Brenner and all the other German prisoners; and he added: "Oh, that I could thus serve all the Christian dogs!" "A speech and act," says Byron, "not unworthy of Caligula."

The spoil of the Turkish camp was a rich reward for the victors, the sumptuous camp equipage of the Vazir falling to Prince Eugene's own share.

After the battle the Prince marched to Temesvar, and that fortress, which had held out for seven years under old Khoja Ja'far Pasha in the previous war, now fell after a month of open trenches. The Turks, wishing to insert an article in the capitulation in favour of some Hungarians who had taken their side, and were aiding in the defence, Prince Eugene declared that such rabble might go free for all he cared; and he said afterwards that contempt was the best weapon wherewith to fight a contemptible enemy.

The battle of Peterwardein was fought on the 5th August, 1716, and Temesvar did not capitulate till the 13th of October, after which the Prince put his army into winter quarters.

Meantime, Field-Marshal Schulemberg had covered himself with glory by his successful defence of Corfu against the Turks, who left 15,000 dead on its breaches and under its walls. The statue which the grateful Republic erected to him stands in Corfu to this day. When the Signoria told him to name his reward, he asked that toleration in matters of religion might be granted to his Protestant co religionists under the dominion of the Republic; and his request was acceded to.

In the spring of 1717 Prince Eugene opened the campaign with the siege of Belgrade. The fame of his last victory had brought such numbers of Royal and noble volunteers to his camp that he said: "I might have had squadrons of Princes if I had chosen." Among these volunteers was Maurice Count Saxe, the gifted son of the strongest man and the most beautiful woman in Europe, Augustus of Saxony and Aurora von Königsmarck.

Belgrade was defended by 30,000 Turks under Shatir Ali Pasha, an officer who had gained reputation under the late Vazir. As Prince Eugene was reconnoitring the defences the very first day he arrived before the town, the Turkish Sipahis made a sudden sally and attacked him and his escort.

There was sharp fighting before they were repulsed, and Eugene had to use his pistols to defend himself against an officer of the Sipahis, who was finally knocked over with a blow from a clubbed musket by a dragoon of the escort.[1]

Prince Eugene drew lines of investment round the city from the Save on the west to the Danube on the east, and kept his communica-

[1] This incident forms the subject of a picture by Van Wyck, now in the possession of T. Croysdale, Esq., of Hawke House, Sunbury-on-Thames.

tions open with his base at Semlin by means of two bridges of boats, one over the Save, the other over the Danube. He had a flotilla of armed boats accompanying his army which destroyed or drove ashore all the Turkish craft in the river, and blockaded the city on the water side. In order to keep the German gun-boats at a distance, Shatir Ali Pasha converted some boats that had been saved into floating batteries and moored them in front of the town. Eugene met this move by erecting batteries of heavy guns on the north bank of the river to dominate the defences of the Turks; but Shatir Ali Pasha sent a forlorn hope of Turks across the river in small boats under cover of the night, who surprised the Germans, sabred the gunners, and wrecked the batteries, and returned again to Belgrade before they were discovered by the dawn.

The garrison also made frequent and desperate sorties on the land side, and fighting went on continuously; but in spite of all their efforts the investment was completed, the approaches vigorously pushed forward, and the walls breached in several places. Eugene hoped to capture the city before the arrival of a Turkish army assembled for its relief; but he was for some time prostrated by a severe attack of the malarial fever which always affected the German troops in the unhealthy marsh-lands of the Danube, and was now making great ravages among his soldiers. Meanwhile the Sultan was making great efforts to save the bulwark of his Empire, and had succeeded in collecting an army of 180,000 men at Adrianople for the new campaign, which he entrusted to the command of the new Grand Vazir, with orders to relieve Belgrade at all hazards. Prince Eugene, on hearing of the approach of the enemy's army, entrenched his camp against a possible attack. Had he been himself he would most likely have given battle to the enemy at once in the open field; but he did not recover from his serious illness until it was too late to do so. However, as soon as he rose from his sick bed he resolved to assume the offensive.

On the morning of the 22nd July the garrison of Belgrade and the German besiegers saw the distant hills white with the turbans of the Turkish host. The Prince did not interrupt the progress of the siege, and the Vazir feared to attack the Germans in their entrenchments; he fortified his own camp, and proceeded to advance by sap and by regular approaches up to the entrenched camp of the besiegers. Prince Eugene thus found himself hemmed in between the fortress he was besieging and the encircling army of the Grand Vazir, which was besieging his camp. Never had such a spectacle been seen in European war, since Cæsar besieging the Gauls in Alesia, and himself besieged by their encircling hosts, had surrounded his camp with lines of circumvallation and contravallation.

The situation appeared desperate, but Eugene was not only confident of victory, but managed to inspire his troops with his own confidence. The Turks pushed their approaches so close that men were killed in the German camp by their musketry, and balls fell around Eugene's own tent. He learned from his spies that the Vazir had planned a general attack on his camp, in conjunction with Shatir Ali Pasha, who was to make a sortie with his whole force from Belgrade; and he determined to forestall them. He made all arrangements for a night attack, and provided plank bridges for his infantry

to pass over the Turkish trenches and fascines to fill them up for the passage of his cavalry. He told off 20,000 men to hold the trenches against the town, and the remaining 40,000 to assail the Vazir's camp. At one o'clock on the morning of the 15th August the German columns moved to the attack, in a darkness made denser by a thick fog. The Turks kept no watch, and were taken completely by surprise. Many took to flight at once, and the whole army was thrown into a confusion that could not be remedied. The Janissaries made some stand, but were charged and dispersed by the Bavarian horse, who crossed the trenches by means of the fascines. Though left without orders or direction, many Turks fought on bravely until their own cannon were turned upon them by the Germans. Two German battalions in line were charged and destroyed by the Turkish horse. Prince Eugene had seen their danger and had sent Maurice de Saxe, who was acting as his galloper, to warn them of the vicinity of the Turkish horse; but he was too late. As he rode up he saw the two battalions make ready, present, and fire a volley into a dense mass of Turkish cavalry that was rushing in upon them. The volley and closing were at one and the same moment; the two battalions had no time to fly, and were all sabred. Except the mounted officers and an ensign, who saved himself by clinging to the stirrup of one of them, every man in the two battalions was cut down within a space measuring not more than forty yards from front to rear.

After the Germans had recovered the ground, the first thought of their leaders was for the clothing of the fallen men, which was the property of their colonels. Sentries were posted at the four corners of the ground, and fatigue parties were set to work to collect the hats, coats, and shoes into heaps.

Count Saxe counted the bodies of the slain Turks, and found that only twelve had fallen to the volley fired point-blank into them by the two battalions, and this circumstance influenced his whole career, causing him to despise the effect of fire and to rely for victory on the *arme blanche*. Of course, the explanation of the small loss of the Turks is that the German soldiers in their flurry took no aim, and fired too high. The effect of the musketry fire of the British Foot at Fontenoy must have modified Count Saxe's opinions. His experience in Turkish wars also imbued him with a high opinion of the value of the lance as a cavalry weapon, and he strove to re-introduce it into the French Army, from which it had been totally discarded. Montecuculli styled the lance "La Reine des *armes blanches*," from its effects against the scimitar-wielding Turkish cavalry; and all the nations who habitually encountered the Turks, such as the Poles, Croats, and Cossacks, adopted the lance for their favourite weapon, as the Turk could not parry its thrusts with his curved sabre. The Hungarians, however, themselves an Oriental nation, shared the predilection of the Turk for the sabre.

In this battle, Prince Eugene was himself wounded by a sabre cut, the thirteenth wound he had received during his long and glorious career. By noon all resistance on the part of the Turks had ceased, and their whole army was in full flight, abandoning their guns, camps, and baggage to the victors. 5,000 Turks were left dead on the field of battle, and 3,000 more were killed in the pursuit, and 5,000 were made prisoners; the German loss was 2,000 killed and 3,000 wounded. The spoil was enormous; the Turkish Pashas, true to the instincts of their nomad ancestry, lavished their wealth and

indulged their taste in providing themselves with splendid camp equipage and martial finery. Persian carpets, Syrian silks, Damascus sabres, Arab and Turkoman horses rewarded the valour of the Germans. Even the Turkish soldiers were worth plundering, for they were themselves keen on pillaging, and many of them took up arms and followed the flag for no other purpose. The coins and trinkets of which they had eased the people who were so unlucky as to be found on their line of march found their way into the haversacks of the German soldiers and camp followers after a battle. The mother of Ferdinand, Count Fathom, in Smollett's romance, enriches herself by the plunder of the slain Turks after Peterwardein and Belgrade. These allusions to Eugene's victories are to be met with in all the contemporary literatures of Europe, for no other wars or great public events distracted public attention at the time, and the Prince's brilliant achievements excited universal astonishment and admiration. He was ranked as a champion of Christendom with Scanderbeg and Sobieski. Sir Roger de Coverley, in the *Spectator*, discusses whether Eugene is a greater man than Scanderbeg. The poet Pope was doubtless inspired by the accounts of the rout of the Turkish armies on the battle-fields of Hungary when he wrote the lines in "The Rape of the Lock":—

> "Thus, when dispersed, a routed army runs,
> Of Asia's troops and Afric's sable sons;
> With like confusion different nations fly,
> Of various habit, and of various dye."

The garrison of Belgrade, threatened with a false attack by the troops left by Prince Eugene in the trenches, had remained inactive during the battle, and Shatir Ali Pasha was so disheartened by the defeat and dispersion of the Vazir's army that he capitulated and surrendered the city the very next day.

Sultan Ahmad III. now sued for peace, and the following year a treaty was signed at Passorowitz on the usual basis of *uti possidetis*, whereby Austria gained Belgrade and great part of Servia; the Turks retained the Morea; and the Republic of Venice was left the chief loser by the war. The Emperor had ostensibly gone to war to protect the interests of Venice, but the Cabinet of Vienna, with the baseness which was characteristic of Austrian statesmanship, sacrificed the interests of its ally in order to more easily secure an advantage for itself. This meanness, however, did not go unpunished, as will be seen in the result of the next war. The Turks from this time forth abandoned all hope of recovering Hungary, and never again attempted to extend their territories in Europe. On the contrary, they soon found themselves occupied in defending what was left to them against the attacks of their enemies.

The war had lasted only two years, and is chiefly memorable for the two great victories of a small and disciplined European army over a numerous and barbarous Asiatic horde, which may fitly be compared to the triumphs of the Greeks over the Persians at Marathon and Arbela, and of the British over the Mahrattas and Sikhs at Assaye and Sobraon. The strategy and tactics of Eugene were those of Miltiades and of Alexander, of Wellesley and of Gough, and the same as were afterwards practised by Suvaroff against the Turks: to seek out and attack the enemy, regardless of the odds of numbers or position, whenever and wherever he could be found.

The Sixth War.

This war lasted only for three years—little longer than the preceding one—but the result was very different. It ended in the Germans being worsted at all points, and the retrocession of Belgrade and Servia to the Porte. This result was due, not to any great superiority on the side of the Turks, but simply to the ineptitude of the Cabinet of Vienna and the incompetence of the Austrian Generals.

The Russians suffered much from the continual raids of the man-stealing Tartars of the Crimea, and the Empress Anne, being unable to obtain redress or satisfaction from the Porte, declared war against Turkey in 1736. The successes of the Russian armies at Oczakoff and in the Crimea excited expectations in Europe of the impending collapse of the Turkish Empire, and the Emperor of Germany, Charles VI., thought that he could emulate the victories of the Russians and perhaps forestall them at Constantinople. He also had his grievances against the Turks, who, even in time of peace, harried the borders of Hungary and Sclavonia and carried off women and children into captivity. He allied himself with the Empress of Russia and declared war against the Sultan. There was great excitement among the Christian subjects of the Porte; pretended prophecies were circulated foretelling the triumph of the Cross and the downfall of the Crescent, and the Christian population of Bosnia and the Herzegovina rose in revolt against their Turkish masters. Had they delayed their movement until the Austrian troops had crossed the frontier they might have rendered mutual assistance to each other; but no aid was forthcoming for the revolted Rayas, and the Turks pounced upon the ill-armed and undisciplined multitude of unwarlike peasants on the banks of the Kolubara, and destroyed them in one terrible carnage.

The preparations of the Austrian War Office were so tardy that it was nearly the end of July before an army of 70,000 troops of all arms was assembled on the frontier. Prince Eugene had died full of years and honours in 1736, and the chief command of the army was now entrusted to Field-Marshal Seckendorf, familiar to readers of Carlyle's "Frederick the Great" as the Imperial envoy at the Court of Berlin. He had been a trusted lieutenant of Eugene, but he lacked the strength of will and decision necessary for an independent command. He might be compared to Marshal Berthier, Prince of Neufchatel, of whom Napoleon said: "As Chief of the Staff, Berthier had no superior; but he was not fit to command five hundred men."

Field-Marshal Seckendorf's plan of campaign was to reduce Widdin, and to join hands with the Russian army advancing to the Danube through Wallachia. He had formed this plan in concert with the German Field-Marshal, Münnich, who held the chief and uncontrolled command of the Russian Army. A smaller German Army, under the Prince of Saxe-Hildburghausen, was to invade Bosnia. Seckendorf had already formed his magazines at Orsova in preparation for the siege of Widdin, when he received a peremptory order from the Emperor to invade the Ottoman dominions by way of Nissa, in order to forestall the Russian arrival at Constantinople. The Field-Marshal lacked the courage of Eugene to disobey orders from Vienna, and the munitions and supplies were transported with much labour and loss of time from Orsova to Nish, which was occupied almost without resistance, for the Turks were as unprepared for war as the Austrians. A corps under General Khevenhuller was despatched to besiege Widdin.

Meanwhile the Prince of Saxe-Hildburghausen had crossed the frontier into Bosnia and laid siege to Banialuka. His invasion roused the warlike Mussulman Sclaves of Bosnia, who swarmed around the besieging army like hornets, attacked its outposts, cut its communications, and harassed it so incessantly that the Prince was fain to raise the siege and to retire across the Save, while the Turks, crossing the river in small bodies at different points, began to ravage Sclavonia. The German troops proved no match for them in the guerilla warfare which they carried on, and the Emperor now recalled Seckendorf from Nish to the assistance of Saxe-Hildburghausen. The Field-Marshal marched with his army upon Bosnia, and drove the Mussulmans back within their borders; but the vigour with which they carried on guerilla operations, and the lateness of the season, prevented him penetrating far into the country. As soon as he had quitted Nish, a Turkish Army appeared before it, and summoned the German General Doxat, who had been left as Governor by Seckendorf, to surrender. The fortifications were out of repair, and the garrison weak and dispirited, and the General, believing the place to be untenable, capitulated.

General Khevenhuller, finding Widdin obstinately defended by a strong Turkish garrison, and his flank exposed by the surrender of Nish, raised the siege and retreated. The Turks followed him, and he had to fight a severe action with them before he could make good his retreat across the Danube into winter quarters in Transylvania.

Seckendorf and his army went into winter quarters at Shabatz, on the Save. He was very unpopular with both officers and men, and was on bad terms with most of his subordinate commanders. He seems to have had little confidence in himself, and certainly had not Eugene's gift of inspiring confidence in others.

The Emperor was greatly chagrined by the failure of the campaign, which was really due chiefly to his own inter-meddling; and he made a scapegoat of Seckendorf, who was deprived of his command and impeached for misconduct. But he was easily able to clear himself of the charges brought against him. The unfortunate General Doxat was, however, condemned and beheaded for having surrendered Nish to the Turks, though he was unprovided with sufficient means or forces for its defence.

Francis, Duke of Lorraine, husband of the Emperor's daughter, the Archduchess Maria Theresa, was appointed to succeed Seckendorf in the command of the army, and was given as Adlatus, or adviser, Count Königsegg, an experienced officer of great repute in the Imperial Service. The Duke had served in the previous campaign as a volunteer under Seckendorf, but he had no military talent or qualification for command.

The Imperialist Army was reinforced by a contingent of 8,000 Saxons, but the troops generally were ill-found, and had too large a proportion of recruits among them. They were dispirited by the fatigues, privations, and ill-success of the last campaigns, and had little confidence in their chiefs, many of whom were incompetent leaders owing their promotion to noble birth or Court favour.

The Turks still looked upon Russia as a remote and barbarous Power, from whom little danger was to be apprehended; they therefore employed their largest army and their best troops against the Germans in Servia, under the command of the Grand Vazir, Yegen Muhammad, who was fortunate in having as his lieutenant and

military adviser Ahmad Pasha, the *ci-devant* Count Bonneval, a renegade Frenchman and soldier of fortune. This adventurer had served the King of France and the Emperor of Germany, and had commanded a regiment at the battle of Peterwardein, where he was wounded in the desperate charge of the Janissaries, and would have been killed but for the devotion of some of his men, who saved his life at the expense of their own. After the conclusion of peace, seeing little prospect of promotion in the Imperial Service, he went over to the Turks, turned Mussulman, and rose to high rank in the Sultan's service. He improved the training and discipline of the troops, and added two new corps, the Khumparajis (Bombardiers) and the Laghumjis (Miners) to the paid or standing army. He taught the Turks to rely on their skill in skirmishing, and to avail themselves of their aptitude for partisan warfare; and they appear to have profited by his instructions, for they never gave way to panic in this war as they had done in former wars against the Germans, and as their comrades still did in the battles with the Russians on the northern frontiers of the Empire.

The Turks were early in the field in 1738, and had over-run and ravaged Servia up to the walls of Belgrade before the Austrian Army was ready to move. The Grand Vazir had formed the siege of Orsova; but when the Austrian Army advanced to its relief, he raised the siege and marched to attack his enemy in the field. After a bloody but indecisive action, the Turks retreated and the Germans advanced upon Orsova. Another action was fought without decisive result; but this time the Germans had the worst of it, and they retreated upon Belgrade. It was remarked that in these actions the Turks, after their attacks were repulsed, rallied and reformed, and when forced to retire, did so in good order. The Grand Vazir resumed the siege of Orsova, and the fortress soon capitulated. The Turks thus became masters of a fine battering train and much war-like material, which had been accumulated there in readiness for the siege of Widdin. The Emperor was greatly grieved by the loss of Orsova, and exclaimed that the good fortune of his Empire had departed with Eugene. He removed his son-in-law and Count Königsegg from the command of the army, and appointed Count Wallis, who had gained his confidence by his fearless and outspoken criticisms of the short-comings of his predecessors, to the chief command. But he had soon reason to regret his choice; the critic committed faults and mistakes worse than those which he had so freely condemned.

The Grand Vazir, Yegen Muhammad, had incurred the displeasure of the Sultan, and had been replaced by Alhaj Muhammad Pasha, who opened the campaign of 1739 by advancing upon Belgrade at the head of a large army. Count Wallis crossed the Save on the 27th June at the head of an army of 113 squadrons of cavalry and 67 battalions of infantry, aggregating 56,000 men besides artillery and light cavalry. The two armies met near the village of Crotzka, which was occupied by the Turks. The Austrian troops were hampered by having to pass through a defile to attack the enemy in position. The Hungarian Hussars were routed by the Turkish horse, and took refuge behind the German Cuirassiers, on whom the Turks could make no impression. The Austrian Grenadiers cleared the defile at the point of the bayonet, but had great difficulty in debouching from it under the repeated attacks of the Turks. The battle lasted from 5 a.m. till sunset, the Austrian troops being unable to advance in face of the

superior numbers and repeated attacks of the enemy. "One should avoid engaging the Turk in great skirmishes," wrote Montecuculli, "for he has too much the advantage in them," and the battle of Crotzka was only a skirmish on a large scale. Darkness put an end to the fighting, and Wallis drew off his troops and retreated, leaving 7,000 men, of whom 400 were officers, dead on the field. The Turkish loss was also heavy; but the retreat of the Germans gave them fresh courage, and they promptly followed up the retiring enemy. The Grand Vazir attacked the German Army at Kinza, and was repulsed; but Wallis now behaved with extraordinary pusillanimity, and withdrew his army across the Danube, leaving Belgrade open to the attacks of the Turkish Army. The Grand Vazir laid siege to the city, and Wallis wrote to the Emperor, advising him to purchase peace by the cession of Belgrade.

The Emperor sent Count Neipperg as Plenipotentiary to treat with the Grand Vazir; but the Count, with the extraordinary infatuation which seemed to affect all the Austrian Statesmen and soldiers during this war, neglected to take hostages for his safety, as was generally used when treating with the Turks. The Grand Vazir arrested and ill-treated him and threatened him with death unless he signed an order for the surrender of Belgrade. The French Ambassador at the Sublime Porte affected to intervene for his release, but he secretly encouraged the Turks, in pursuance of the traditional policy of the Court of Versailles, to weaken the House of Austria. Count Neipperg was persuaded and bullied into signing an order for the surrender of one of the gates of Belgrade to the Turks, and the Grand Vazir's troops marched in proudly, displaying some standards which they had captured at Crotzka, to the great mortification of the German garrison, who were prepared to defend the place to the last. Count Wallis meanwhile had plucked up sufficient courage to advance to the relief of Belgrade; but it was already too late. The Emperor was heartily sick of the whole business, and purchased peace from the Porte by the cession of Belgrade and Servia, thus giving up all that had been won by the victories of Eugene.

After this there was peace between Germany and Turkey for fifty years. The Seven Years' War afforded the Turks a grand opportunity for assailing their old enemy; but Turkey had ceased to be an aggressive Power, and the French, being allies of Austria in this war, exerted all their influence at the Porte to keep the Turks quiet. It was only just at the end of the war that "the Ottoman Porte used threatening language, and a hundred thousand Turks were mustered on the frontiers of Hungary."[1] But the storm blew over, and when war broke out for the last time between the two nations, it was Austria who was the aggressor again.

The Seventh War.

This seventh and last war between the Germans and the Turks lasted for three years, and ended without result. It was begun by Austria as the ally of Russia, the glory that was gained in it by the arms of Austria was shared by Russia, while the profit was Russia's alone.

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[1] Macaulay's Essay on Frederick the Great.

During the closing years of the eighteenth century, the Ottoman Empire reeled under the blows of the Russians, whose arts and arms were now directed by the commanding genius of the great Empress Catherine. In 1787 her seizure and annexation of the Tartar Khanate of the Crimea provoked the Turks to declare war against Russia, and in the summer of that year the Emperor of Germany, Joseph II., visited her at Cherson, whither she had come to inspect her new acquisitions.

Schemes for the dismemberment and partition of the Ottoman Empire were discussed between the two sovereigns, and when the Porte declared war against Russia, the German Emperor announced to the Sultan that he would have to fight Austria as well. He forthwith made great preparations for invading the Ottoman dominions, and assembled four armies on the frontiers of Moldavia, Wallachia, Servia, and Bosnia respectively. King Frederick William of Prussia endeavoured to dissuade Joseph from an enterprise which would probably tend to the further aggrandissement of Russia; but the Emperor replied: "The sword is drawn, and it shall not be returned to the scabbard till I have regained all that has been wrested from my house; and you are not the man to dissuade me, for it was you who robbed my mother."

But without any formal declaration of war the Emperor made a treacherous attempt to surprise some of the Turkish frontier fortresses on the night of the 20th December. General Alvinzi, with 12,000 picked men, was to surprise Belgrade; but to avoid suspicion the force was divided into two columns, which were to unite under the walls of the doomed fortress. The General reached the rendezvous with one column; but the other missed its way in the dark, and while Alvinzi impatiently awaited its arrival, the dawn broke and disclosed to the astonished Turks on the walls a body of Austrian troops drawn up on the glacis. The Pasha sent out a messenger to demand the reason of this armed incursion into his Master's territories. Alvinzi returned an evasive answer, and retired with such precipitation that some of his men were drowned in their hurried re-crossing of the Danube. At Gradiska the Germans actually escaladed the walls, but were driven out again by the Turkish garrison, having had 80 men killed and 350 wounded in their unsuccessful attempt. However, Drosnik and some other Palankas on the Bosnian frontier fell into the hands of their treacherous assailants, and in one place the Turkish garrison, surprised in its sleep, was put to the sword. But even this affront did not draw forth a declaration of war, as the Porte was still desirous of staving off an Austrian war while the Russian one was on their hands; so at length, on the 10th February, 1788, the Emperor Joseph declared war and placed himself at the head of the army destined for the invasion of Servia. The veteran, Marshal Lacy, commanded under him. Prince Lichtenstein invaded Bosnia, and the Prince of Coburg entered Moldavia to effect a junction with the Russian armies and capture the strong fortress of Choczim, the northern-most bulwark of the Ottoman Empire.

The Emperor joined his army before Shabatz, which was already invested. The town was taken by storm on the 24th April, and he citadel with its garrison of 1,000 Turks capitulated the next day. The Emperor threw three bridges over the Save, and marched on Belgrade.

The Grand Vazir, Yusuf Pasha, had meanwhile assembled a host of 200,000 men at Silistria, which could scarcely be called an army. A Turkish Army was, at this period, in the words of Carlyle, "a mass incurably chaotic." The old military system of the Ottoman Empire had completely broken down; the general mal-administration had ruined the agricultural interests upon which the efficiency of the military fiefs depended; the disorders of the finances compelled the Government to provide for the pay and maintenance of the Sipahis and Janissaries by making over to them the collection of the customs and other revenues which transformed these military corps into financial corporations and political clubs. They preserved their old organisation, but had neither training nor discipline. The Turkish armies consisted chiefly of bodies of Volunteers fighting for the sake of their Faith or for the hope of plunder; and of irregular soldiers engaged and paid for the campaign.

The Grand Vazir divided the host into several armies, despatching them under the command of Seraskiers to meet the invaders at different points. He himself, at the head of 80,000 men, marched to the relief of Belgrade. But he halted his army short of that city, and made preparation for crossing the Danube into Transylvania's Banat. This move had the desired effect; the Emperor, fearing that his own provinces would suffer cruelly from the ravages of the Turks, withdrew his army from before Belgrade and encamped at Semlin on the north bank of the Danube to watch the Vazir's movements. For two months the two armies remained inactive, and the unhealthy climate of the Danube marsh country grievously affected the efficiency of the Imperial Army. The ranks of the German troops were decimated by malarial fever, and Yusuf Pasha, encouraged by reports of the enfeebled condition of the enemy, boldly crossed the Danube on the 7th August, and began to ravage the Banat. The Austrian detachments were driven in, and the Division of General Papilla was overwhelmed in the neighbourhood of New Orsova by the numbers of the Turks, and the fury of their onset. Two battalions were cut to pieces, and the rest put to flight, and 13 guns with all the stores, camp equipage, and baggage of the Division were captured. New Orsova and other towns were sacked and burned. The Emperor and Field-Marshal Lacy, with 40,000 men, quitted the camp at Semlin and marched to protect Transylvania, and the two armies faced each other. But Joseph behaved with irresolution and timidity; he would not attack the Turks, who gained many advantages in the war of skirmishes and outposts which they continually carried on. Their numbers enabled them to outflank and to threaten to surround the Imperialist Army, and Joseph gave the order to retreat, abandoning his position at Karansebes facing the Vazir. The timidity of the Emperor, and of Field-Marshal Lacy who was now old and feeble, had infected the troops, and the order to retreat before the enemy thoroughly dispirited them.

They marched at night to avoid interruption by the Turks, and two columns, crossing each other in the dark, each mistook the other for the enemy, and opened fire, and 1,400 men were killed and wounded before the mistake was discovered. This caused a panic, and a stampede amongst the train of the army, and some guns, and many wagons, and much baggage was abandoned on the roads and fell into the hands of the Turks next day. When the Imperial Army halted at Lugos five thousand men were reported missing.

But the Grand Vazir was doubtful of the result of a general attack upon the Austrian Army, and would not risk it. In the incessant fighting which went on at the outposts, the Turks, being the assailants, and generally attacking blindly and rashly, had lost much more heavily than the Germans; and the Vazir found his ranks sadly thinned. The winter set in early with heavy rains and cold which disheartened the Turkish soldiery, and on the 20th October, their army began its march to Belgrade to go into winter quarters. It was now the turn of the Grand Vazir to retreat, and of the Emperor to pursue; but the Turks made good their retreat without much molestation. The Emperor's health had suffered much from the fatigue and exposure of the campaign, and he had not gained any reputation as a soldier.

Meanwhile, Prince Lichtenstein had invaded Bosnia and laid siege to Dubicza. A breach was effected, and an assault given, but it was repulsed by the garrison. Before it could be renewed an army of 12,000 Turks and Bosniak Mussulmans arrived to relieve the place, and they attacked the besiegers with such vigour that they forced Prince Lichtenstein to raise the siege and re-cross the Unna. He resigned his command on the score of ill health to the veteran Marshal Loudon or Laudohn, the hero of Hochkirchou and Kunersdorf. It was he whom Frederick the Great invited to sit beside him at a banquet, saying to him, significantly: "I would rather have you beside me than opposite me." He resumed the siege of Dubicza and took it and Novi also, by wearing down the resistance of the brave defenders, and defeating all attempts to raise the siege.

He then laid siege to Gradiska, but the autumnal rains setting in flooded the rivers and impeded his communications and compelled him to raise the siege.

The Prince of Saxe-Coburg had led his army from the Bukovina into Moldavia early in May, expecting to be joined by the Russians; but instead he found himself furiously attacked on the heights of Rchatin by a superior force of Turks.

The battle raged for three days with hardly any intermission and without any decisive result.

The bravery of the Turks excited the admiration of their enemies, but their rash intrepidity cost them dear, and though the losses on both sides were heavy, those of the Turks were much the heaviest; the Austrian artillery having made fearful havoc in their massed formations.

The Prince of Coburg resumed his march on Choczim, and had already commenced the siege of that famous fortress before the Russian Army under General Soltikoff arrived. Three Austrian and two Russian batteries opened a terrible bombardment with shells and red-hot shot; the whole place was in a blaze; even the palisades in the ditches, and the gabions in the revetments were set on fire.

The place was summoned, but the Turkish Seraskier asked for a suspension of hostilities for three days that he might deliberate on the terms with his officers. He employed the three days in repairing his defences and replenishing his magazines, and making all preparations for a prolonged defence. He then informed the allied Generals that he found himself under no necessity to surrender the fortress. He held out for two months longer against continual bombardments and repeated assaults, and finally with the remnant of his garrison

amounting to 3,000 men, marched out with the honours of war. The capture of Choczim closed the campaign in Moldavia.

In November an armistice was concluded between the Imperialists and the Ottomans, and the Emperor Joseph quitted the army and returned to Vienna, stricken by a disease that proved mortal.

The Russians had in this campaign made great progress and gained many victories on the shores of the Black Sea, and the Turks were much dispirited by their losses, for which they laid the blame on the Grand Vazir, Yusuf Pasha. He was protected by Sultan Abdul Hanid I. from the fury of the army and the people, but when the Sultan died in the spring of 1789, the unfortunate Vazir was first deposed and afterwards murdered by the new Sultan Selim III. Field-Marshal Loudon was now appointed to the chief command of the army on the Danube, and he opened the campaign of 1789 by resuming the siege of Gradiska. Without breaking ground he opened a most furious bombardment with such effect that after enduring it for two days the Turkish garrison evacuated the place and fled away during the night. Loudon's next enterprise was the siege of Belgrade. The trenches were opened on the 12th of September, and after an incessant cannonade and bombardment for twenty days, the town was carried by assault. Osman Pasha, with the garrison, retreated into the citadel, where he held out for some time longer, till the besiegers were preparing to assault. He then requested an armistice for a fortnight, and when his request was refused he capitulated, giving up the citadel with 300 guns and great stores of warlike material. The Germans now over-ran all Servia, and besieged Orsova, but the garrison held out until the approach of winter raised the siege.

In Moldavia, in April, General Dorfelden had defeated a Turkish Army on the River Sereth, killing 1,500 Turks and capturing their camp with all their artillery and stores. This was only a forerunner of greater victories. The Prince of Coburg and General Suvaroff, at the head of an allied Austro-Russian army, invaded Wallachia, and on the 31st July successfully stormed the camp of the Turkish Seraskier at Fokshani, which was defended by 30,000 men, a force much superior in numbers to their own. The Seraskier and 5,000 Turks were made prisoners, and all their artillery, stores, and baggage became the prey of the victors. The news of this victory, the greatest that had been gained by the Austrian arms for a long time past, was received with great rejoicing in Vienna, and cheered the Emperor on his sick bed.

Shortly after, the Prince of Anhalt-Bernberg, with an inferior force, attacked and routed a corps of 7,000 Turkish Sipahis, taking their commander prisoner, and capturing their camp and all their baggage.

The Grand Vazir now crossed the Danube with an army of 100,000 men, and marched to meet Coburg and Suvaroff, who were advancing with 30,000 Austrians and Russians. He carried with him many iron manacles and fetters for the Christian soldiers whom he expected to capture in great numbers. The two armies met at Rimnik, where the allies gained a victory more brilliant than the triumphs of Lake and Wellesley in India. The immense Turkish host was completely routed and dispersed; 5,000 Turks were killed in the battle, and 2,000 in the pursuit; nearly 100 cannon, 100 standards, 8,000 tents, all the ammunition, stores, and baggage of the army, with many camels and oxen, were captured. No prisoners were made,

for no quarter was given. The loss of the victors was only 100 men! The Grand Vazir suffered the usual penalty for defeat, being beheaded by order of the Sultan.

The Prince of Coburg received the Field-Marshal's baton from the Emperor as the reward of victory. The close of the campaign saw all Wallachia as well as Servia in the possession of the Austrians and their allies.

The German Generals enrolled the Serbs in a Militia, and employed them to garrison the captured fortresses. The Sclaves hated the Catholic Germans almost as much as they hated the Mussulman Turks; and the policy hitherto pursued towards them by the Court of Vienna had not tended to lessen their hostility; but Joseph, who was in his ideas and opinions a full century in advance of his time, accorded complete toleration to all religions, and treated the Servians not as heretics and aliens, but as fellow-Christians and fellow-citizens, and they consequently served him with alacrity and fidelity.

The Emperor Joseph died on the 7th February, 1790, and his successor, Leopold, alarmed by the gathering storm of the French Revolution on his Western frontiers, was anxious to get rid of the Turkish war at any cost. He opened negotiations with the Porte, but meanwhile hostilities were resumed in the spring by the renewal of the siege of Orsova. It had hardly commenced when the town and fortress were shaken by a slight shock of earthquake. The Turks imagined that the tremor was caused by underground operations of the enemy, and that they were about to be blown into the air, and they consequently evacuated the place in a panic. After taking possession of Orsova the Prince of Coburg formed the sieges of Widdin and Giurgevo; but before either place could be taken the Emperor had abandoned the Russian alliance and concluded a peace with the Porte.

The last action of the war cast a gleam of success upon the Ottoman arms. The Prince of Coburg, hearing that a Turkish force was advancing to relieve Giurgevo, despatched General Thurn at the head of an Austrian Division to intercept it. Thurn, full of contempt for the Turks after late experience of them, advanced boldly to meet them in the open field. The Turks charged with fury, and broke the Austrian line. Thurn was trying to rally his broken troops when his head was severed from his body by the stroke of a Janissary's sabre. 700 Germans were left dead on the field, and 2,000 were wounded. The siege of Giurgevo was raised, and eighteen battering cannon in the trenches were abandoned to the enemy.

This was the last action of the war. The new Emperor was so anxious for peace that he resigned all the conquests that had been made, and restored Servia to the Sultan. The Servians were bitterly disappointed at being thus abandoned, but the short interval of liberty they had enjoyed under the rule of Joseph, and the military training many of their youth had received under the Austrian colours, had planted the seeds of a national resurrection in the hearts of the Serb people. "Neighbour, what have you done to our Rayas?" exclaimed a Turkish Pasha to the German commissioner who was handing over to him the keys of a Servian fortress, when he saw the martial bearing of the Servian Irregular soldiers by whom it was garrisoned. The lessons learned in Austrian barracks were soon after practised in the field under Kara George and Milan Obrenovitch.

Conclusion.

The Turks and Germans are no longer neighbours, for Austria has ceased to have any political connection with Germany. Russia has become the enemy to be most feared by the Turks instead of Germany, and the Sultan now looks to Germany for advice and aid, just as his predecessors formerly looked to France for advice nd aid against the arts and arms of Germany. The Sclavonic peoples of the Balkan Peninsula look to Russia, not only as a kindred nation, but as the only Power that has helped them in their struggles for freedom. Austria withdrew from any active participation in the affairs of the Balkan Peninsula for a whole century. She established a military frontier against the incursions of the Turkish bands, which were always to be dreaded even when the two Empires were on the most friendly terms. On this frontier all the male inhabitants were trained to arms and enrolled as soldiers; the village furnished a company, the district a battalion, the province a regiment. It was a miniature prototype of the present system of universal compulsory service, in which it has now been merged.

The frontiers of Austro-Hungary no longer march with those of the Ottoman Empire, except in the Sanjak of Novi-Bazar; for Servia and Montenegro are no longer dependencies of that Empire.

The Treaty of Berlin handed over the administration of the Turkish provinces of Bosnia and Herzegovina to Austria, and those provinces which had in three wars successfully resisted a German invasion, were, in 1878, occupied by Austrian troops. The occupation was intended and expected to be a peaceful proceeding, but the warlike Mussulman Sclaves of Bosnia, indignant at having been handed over by their Sultan to the rule of infidels, took up arms against the intruders and once more expelled them from their country. But the Austrians returned with a larger force, and with the odds of numbers, as well as of skill and science, against them, the brave Mussulmans were forced to die or submit to the fate against which their forefathers had fought long and successfully. They now bear arms under the banner of the double Eagle, and garrison the cities which their ancestors attacked or defended under the flag of the Crescent.

NOTES UPON COMPANY AND BATTALION TACTICS AND THE EMPLOYMENT OF ARTILLERY IN BATTLE.

BASED ON THE EXPERIENCES OF THE RUSSO-JAPANESE WAR OF 1904-5.

By Captain A. DEGTYAREV.

Translated from the *Voïennyi Sbórnik.*

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6. INFANTRY IN THE ATTACK BY NIGHT.

UNFORTUNATELY, the tactical employment of infantry in operations by night is dealt with only to a very limited extent in all publications on elementary tactics. Such details as are given relate merely to the special cases of sudden attack by troops in close order, in which the main element of success is secrecy. It is actually laid down in the instructions that firing lines should not be sent forward, but only scouts and connecting files to maintain communication between the advancing columns (Part II., para. 241). The perfection of modern firearms has, however, rendered night fighting of the highest importance, and it is difficult to count upon taking the enemy by surprise in order to neutralise his superiority in numbers.

The experience of the war brings out the thoroughly methodical characteristics of night fighting, and shows that the tactical success won under the cover of night is merely made good at dawn. Important tactical results, such as those gained at Liao-Yang and Mukden, were due, to a certain extent, to night operations, and no small portion of our general tactical defeats should be attributed to the absence of necessary instructions regarding the tactical employment of infantry and artillery in night fighting. Methods which were suitable at Kars are not altogether applicable to the conditions of modern warfare with its magazine rifles and machine guns. A striking example is afforded by the night attack of the 18th East Siberian Rifle Regiment on the 3rd March, made with the object of recapturing the trenches lost by the 4th Company at Kun-Tu-Li-Chun on the preceding morning. A space of 300 paces had to be crossed between Redoubt No. 7 and these trenches. The attacking party consisted of seven companies in "reserve columns."[1] Complete failure resulted; in the course of three

[1] In the "reserve column" each company is in column of sections; the 1st and 2nd companies are abreast of each other in 1st line, and the 3rd and 4th companies are similarly placed in rear of them at close intervals and distance. (*Trans.*)

or four minutes the companies lost 500 men from rifle and machine gun fire, and retired to the redoubt in disorder.

The consciousness of our want of training in this respect, and our unfortunate experiences on the Sha-Ho, caused steps to be taken, at the end of May, 1905, towards drawing up the requisite instructions for the tactical employment of artillery and infantry in night fighting; but no definite results were attained, and the question remained, in reality, an open one.

In the methodical conduct of modern night operations, such factors as surprise, superiority of forces, successful flanking movements, etc., must not be taken for granted; the worst must be expected and provided for, and it is only by working on a preconceived plan that success can be achieved. It is imperatively necessary that night operations should be practised in combination by the three arms. All solutions of the question based on theoretical principles only may easily fall short of the reality.

As an example of a night attack formation for a company and a battalion, based on theoretical calculations alone, I will quote that drawn up at the end of May, 1905, and recommended for adoption by our troops during our contemplated advance (Figs. Nos. 13 and 14). In practice this formation proved so complicated that it was difficult to carry it out over broken ground even in daylight. Its first trial by the 18th East Siberian Rifle Regiment in the reconnaissance at Hsai-Ta-Li on the 25th August, 1905, exposed all its defects.

Fig. 13.

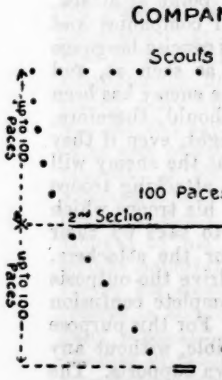

Fig. 14.

It is not difficult to see that the method here depicted fails to satisfy the conditions of night fighting. If a company is acting by itself, it should have, in addition to those in front, scouts to connect both flanks of the line of scouts and of the firing line with the company supports No company commander would employ as scouts any but reliable men, namely, the picked company guides. Since the scouts must follow each other at such distances as will enable them to see each other, 30 men will be required on a dark night for this duty. Moreover, the scouts, in addition to the duty of protecting the firing line from surprise, have to communicate to the company commander

everything observed by them in connection with the enemy. A simple calculation will show that a company is thus weakened, to the extent of nearly one whole section, of its very best men. It is impossible to make sure that the scouts will merge themselves in the firing line as soon as the fighting begins; I am convinced that the majority of them, being removed from their commander's authority, will take cover in some safe place or other. Finally, it is impossible to guarantee a surprise attack. The enemy's outposts will always show a bold front, and the line of scouts will be stopped by them. It is evident, therefore, that at the outset there will be an inevitable loss of time while the firing line is merging itself with the scouts.

The best plan is for the firing line to advance and absorb the scouts; but it is more probable that the enemy's outposts will open fire on the line of scouts as soon as they discover them, and draw a direct answering fire from the firing line. In these circumstances it is not to be expected that the scouts will attempt to rejoin the firing line, and they may therefore be regarded as lost for the purposes of the fight.

Practice, confirmed by the experience of war, has evolved the best formation for a company and battalion taking part in night operations.

In carrying out operations with small units, such as a company, battalion, or even a regiment, surprise should, to a certain extent, play the chief part; but the attacker cannot conceal his intentions right up to and including the moment for using the bayonet. In this case, rapidity and prompt action may accomplish more than the most cunning plans ever devised for secretly approaching the enemy. Before a night attack, it is essential that all commanders, down to company commanders inclusive, should be made acquainted with the main features of the plan of the attack, because the proper conduct of night operations is exceedingly difficult. The main point of attack, and the special tasks, if any, allotted to individual companies and battalions, should be clearly and definitely stated in as concise language as possible. Night fighting generally takes place as soon as, and occasionally a considerable time after, contact with the enemy has been established. All officers taking part in the attack should, therefore, make themselves acquainted with the ground by daylight, even if they do so from a distance only. It is hardly likely that the enemy will be taken by surprise; it is more probable that the attacking troops will be fired upon by his outposts, and that those of his troops which are held in readiness for emergencies will be able to take up their positions. This is the most important moment for the attackers, and their whole object at this juncture should be to drive the outposts back on to the hostile position, and thus produce complete confusion in the enemy's lines before his reserves can come up. For this purpose it is necessary to detail as strong a firing line as possible, without any scouts in front; and each company should have its own supports. The companies of the battalion reserve should follow the firing line at a distance of 100 to 150 paces, and behind these, again, should come the battalions in 2nd line at a distance of 400 to 500 paces, opposite the main point of attack. Formed bodies should be connected by scouts. Before a night attack is undertaken, a most careful reconnaissance should be made; the position of the enemy's machine guns should be ascertained, so that the reserves may be led forward without being exposed to their fire. Company supports and battalion reserves, being in close columns on a narrow front, would incur very serious losses if subjected to machine gun fire, though they would probably

suffer very little from rifle fire, because in night firing every man fires straight to his front. The handling of the formation indicated above would not be difficult, because the flanks would be connected by scouts, and the reserves kept well in hand.

This formation also provides for the full use of the bayonet. The firing line is strong enough in itself to make an effective bayonet charge, and, in case of necessity, the reserve can deploy into line (the best formation for bayonet work) in one movement. In this formation, with the formed bodies alone connected by scouts and the flanks observed by detached patrols, the infantry, after passing through its own outpost line, should move forward without hesitation and without halting. The firing line, when met by fire from the enemy's outposts, should drive back the latter with energy, and pursue them closely to the enemy's trenches. This is the attacker's golden opportunity. The situation will not be an enviable one for the outposts, especially on a dark night; they will not be sufficiently strong to hold the attack, and the latter, on account of the darkness, will be very close at hand; hence the necessity for pressing the enemy's outposts hard without a pause; and it is at this juncture that the inexperience of the young officers, generally told off to the foremost line by outpost commanders, will show itself.

If the attackers fail in getting into the entrenchment on the heels of the outposts, their further advance should resolve itself into a vigorous attack with the object of reaching the enemy's obstacles as quickly as possible so as to make a way for the reserves. In this case, it is useful to open a heavy fire from the opposite flank to that on which the main reserve is advancing. The opening of a heavy fire from the opposite flank to that from which it is intended to deliver the principal blow has a great effect on a dark night. The company commander opposite the quarter from which such fire comes is unaware that it is a feint, and naturally reports that he is being attacked; neighbouring units are certain to send orderlies to find out what is taking place on the section which is thus being fired upon; these will get the same report, and when delivering their message will, on their own account, exaggerate the enemy's strength. The general impression, in short, will be that this is the real attack and not a demonstration. The regimental commander is thus placed in an extremely difficult position. He is in command of the section of ground allotted to his regiment, a section sufficiently extensive to have a serious importance in the general line of battle; but he is unable to survey his section with his own eyes, and consequently handles his reserve in accordance with the reports received by him. If the company commander at the threatened point is not an ambitious man, desirous of raising himself in the estimation of his chief, a report in accordance with the facts may be expected. Otherwise, the report received will be something like this: "The section held by No. — company is being attacked; judging by the fire, I estimate that the enemy is in considerable strength." Meanwhile, time slips by, and the decisive blow draws near!

If the entrenchments are approached close enough to allow hand grenades to be thrown, the defenders may be expelled by these alone. The only thing required is that some of the grenades should actually fall in the trenches. Our opponents in the late war were adepts in the use of this weapon.

The opening of a heavy fire from the flank farthest from the reserve draws the enemy's attention away from the main point of attack. There should be no cheering until the actual moment for the bayonet charge has arrived, lest the position of the reserve be prematurely revealed.

If there are no hand grenades, the firing line should employ the following most useful device, viz., to cheer all together before going in with the bayonet, but not to expose themselves for a few seconds; then to pour in a simultaneous fire, and immediately rush the entrenchments. This ruse was often used by our detachments of dismounted scouts with good results. As soon as the enemy's trenches, or other works, are captured, they should be strengthened by machine guns, which should accompany the firing line. The enemy will attempt to recapture his lost position, in most cases as soon as his reserves come up, and it is then that the machine guns will be of the greatest possible help.

The Japanese attack on the night of the 2nd—3rd March on the position held by the 5th East Siberian Rifle Division at Kun-Tu-Li-Chun may be taken as an example of an energetic attack of the kind indicated above.

The distance between the opposing forces was 3,000 paces, and the hostile outposts were at night separated by a distance of 400 to 500 paces. On the night of the 2nd—3rd March strong Japanese lines drove in our outposts at 3 a.m., captured the trenches held by the 4th Company of the 28th East Siberian Rifle Regiment in a trice, and in 40 minutes fought their way to within 1,500 paces of our position. The outposts were driven in so quickly that they had not even time to report the fact that the Japanese were advancing.

The latter strengthened their position during the same night with the aid of sandbags, and forced us to attack them on the 4th under machine gun fire. This counter-attack failed, and the 4th Company brought back from the fight only 35 men out of 230.

An example of a successful attack in the formation indicated above was the capture, on the 25th January, of the village of Wa-Tieh-Shan and its adjoining trenches, by the combined scout detachments and companies of the 17th and 18th East Siberian Rifle Regiments; the Japanese found themselves in exactly the same position as that which fell to our lot on the night of the 2nd—3rd March.

7. Infantry in the Defence by Day.

The position occupied for defence should be adequately fortified, if time permits, since on this will depend in a great measure the success of the defence. Up to the present time a purely passive defence has never been attended with success, and the fortification of a position can easily be arranged so that the offensive can be assumed without difficulty

The weapon of the defence is fire, the effect of which will be in direct proportion to the number of rifles employed, which again will depend upon the length of the firing line, *i.e.*, of the trenches running parallel with the front of the position. Hence the importance of providing trenches for the firing lines.

Closed works (redoubts) can only make full use of their fire when attacked simultaneously from several sides; they are, therefore, more suitable for local reserves, or as rallying points for the firing lines.

The above considerations determine the situation of these works on the position; but, wherever they may be placed, their function is to hold the enemy till the reserves come up, *i.e.*, a *rôle* of passive defence. This *rôle* appertains more particularly to works guarding the keys of the position, or situated behind the firing lines, and to those along the front of the position which are liable to sudden attack from several sides. Such works should have a strong profile, and be strengthened by obstacles.

Works in the front line should possess the following requirements:

1. They should be as invisible as possible.
2. They should admit of an easy assumption of the offensive by their garrisons.

The 35th Infantry Division fortified their position exactly in the manner indicated, and the fighting in October, 1904, proved their method to be correct. The firing line consisted of a series of separate trenches constructed to hold a section or a half company, with intervals of from 30 to 50 paces between them. From 200 to 400 paces in rear of these were trenches for the battalion reserves, and 1,000 paces behind these again were redoubts to hold from one to two companies each.

At Sha-Ho Station the Japanese fortified their position in a similar manner.

Unfortunately, all units were not agreed upon this point. For example, the 5th East Siberian Rifle and the 1st Siberian Divisions adopted for their firing lines a system of continuous entrenchments constructed for firing standing. Although the standing trench has been shown by experience to afford the best cover from fire, the continuous line of entrenchments entailed extremely hard work on the troops, and had a depressing moral effect, in that it conveyed to the rank and file, and sometimes to the commanders, the idea of a purely passive defence. Nor can this be wondered at, when it is remembered that from 150 to 200 paces in front of these works there extended a similarly unbroken line of barbed wire entanglement several miles in length. Under such conditions there can be no thought of assuming the offensive after the successful repulse of an attack. Moreover, when there is a continuous line of fire trenches, the commander will be seized with an irresistible desire to occupy the whole length of front, in which case there will frequently be a paucity of reserves, and the firing line, being thin and weak, will be easily broken through.

The method of fortifying a position adopted by the 35th Infantry Division, mentioned above, meets requirements in a very different manner.

Fire trenches and detached works should be protected by barbed wire entanglements, or by thick abattis. These form the best obstacles. Trous-de-loup are altogether unsuitable, since, on hard or stony ground, it is very difficult to dig them deeper than a man's height, and still more difficult to drive a pointed stake into the bottom of each pit. When, further, it is remembered that there must be three or four rows of such pits if an efficient obstacle is to be provided, it will be seen that the labour involved is prohibitive. Moreover, during a night attack, the enemy's firing lines would take cover in the pits, and, being usually superior in number to the defenders, they would soon establish a superiority of fire. In soft ground, a step for

firing from can easily be made in pits deeper than a man's height with a light entrenching spade.

Lastly, it is impossible not to agree with the general opinion expressed by regimental officers who gained their experience in the late war, that it is useful, when fortifying a position, to construct, at the same time as the trenches for the firing line, and in the same alignment as the latter, a number of closed works to hold about half a company each. The advantages of these works are:—

1. They stiffen the resisting power of the firing line trenches.
2. Being distributed all along the front, they determine to a certain extent the line of the enemy's attack in any given section, and thus facilitate the arrangements for the defence.
3. Being aligned with the firing line trenches, they can be designed so as to bring a cross fire to bear on the ground in front of the firing lines.
4. In the event of the enemy breaking through, and then being driven back by the reserves, they make it very difficult for him to effect his retreat.

The essence of defence is to throw the advancing enemy into disorder by fire, and then to complete his discomfiture by assuming the offensive. The only defence which can lead to decisive success is that which ends in an advance.

Whether the defence is to be stubborn or merely a temporary means of delaying the enemy, the commander should invariably remember that his defence must end in offensive action.

After a reconnaissance of the position and the formulation of a plan for strengthening and defending the same, the troops should be furnished with detailed information as to the strength and dispositions of the enemy, the position of the neighbouring units, and the general plan of defence. In these respects we were found wanting in the late war.

The duties of the commander in defensive action are laid down in detail in the tactical books, and I will, therefore, merely touch here upon a few special points.

The most powerful weapon in the hands of the defence is fire, and the fullest use should be made of it. This means that as soon as the direction of the enemy's attack is revealed, the strongest possible firing lines should be placed in position, supported by machine guns. Company supports are more necessary in defence than in offence. They can always avoid loss either by finding natural cover or by making shelter trenches for themselves. Their principal duty in the defence is to prevent groups of hostile riflemen from enfilading the company. The Japanese frequently succeeded in doing this in the late war. By making use of ravines, ditches, bushes, and even the most insignificant objects, daring skirmishers would advance singly and establish themselves, unobserved, within effective rifle range, thus being in a position to put a score or more of the enemy out of action. The firing line and its commander are so intent on defending their front that they do not notice what is happening, and the losses continue.

Patrols are, of course, responsible for watching the flanks on such occasions, but, as they seldom consist of more than three men, they are unable to act with effect, and, by allowing themselves to become engaged, they may fail to observe something of greater importance.

It is better to tell off one or two sub-sections from the company supports to drive off such skirmishers with a few well-directed volleys. As I remarked above, as soon as the direction of the enemy's attack is revealed, the strongest possible firing lines should be placed in position, supported by machine guns; but it is most undesirable that the latter should be unmasked at long ranges. On the defensive, in daylight, it will always be possible to estimate the strength of the enemy more or less accurately; and unless his strength appears to be excessive, it is a mistake to reveal one's position by opening fire too soon. If necessary, fire should be opened from a few rifles only. In any case, machine guns should be kept concealed. The best plan is to allow the enemy to approach to within 600 or 700 paces, and then to open a heavy rifle and machine gun fire upon him, so as to prevent him from retiring. This procedure requires, on the part of the commander, firmness, self-control, and coolness under fire. As a negative example, I will quote the action of the Japanese on the 20th May, 1905, when the advanced guard of our 2nd Corps attacked their advanced trenches at Chang-Tu-Fu.

The ground at Chang-Tu-Fu to the north of the enemy's trenches was absolutely open; the only cover was afforded by a ravine 1,500 paces from the hostile position. According to the plan of attack, two battalions (one from the 17th and one from the 18th East Siberian Regiments) were to make a frontal attack, while three battalions (of the 17th East Siberian Regiment) executed a turning movement over the hills against the enemy's right flank. The attack was to be supported on the right by two detachments of trained scouts (mounted and dismounted). A reconnaissance was made on the same day by the advanced guard of the 8th Corps, but this corps was withdrawn as soon as the fighting commenced, and the mounted scouts had consequently to move to the westward of Chang-Tu-Fu to observe that portion of the enemy's forces which had faced the 8th Corps, lest they should take an active part in the operations.

As soon as the battalion of the 18th East Siberian Regiment, which formed the fighting line, crossed the ravine, the Japanese opened rifle fire, partly by volleys and partly individual, followed by shrapnel fire from six mountain guns. The battalion continued to advance in spite of the fire, but was met, at a range of 1,200 paces, by such a murderous fire that it was compelled to halt and reply, at first by volleys and then by magazine fire. At this juncture the Japanese opened fire with machine guns, with the result that the battalion had to remain in the same position for more than an hour. By this time the mounted scouts had ascertained that there were two battalions of the enemy in the trenches alone, but they were unable to find out what forces were behind these again.

Our turning column, in spite of flag signalling, disappeared in the hills and rendered no assistance. The order was given to retire, but owing to the heavy fire and to the necessity for collecting the wounded, the men had to run to the ravine singly or in groups of three or four. If the Japanese had held their fire and let the battalions come within 600 or 700 paces it could hardly have got away at all. This the Japanese could easily have done, having every facility for ascertaining our strength from the watch tower at Chang-Tu-Fu Station.

In the defence the immediate reserves should as a rule be kept close to the firing line, and in such a position as to be able to protect its flanks either by fire or with the bayonet. When the attack has

been beaten back, the offensive should be assumed without delay; otherwise the defence will be fruitless.

Apart from the general counter-attack, however, there will be frequent opportunities during the fighting for local counter-attacks by portions of the defending troops, on the initiative of the officers in command. It is most important that such opportunities should be utilised, because the repulse of an attack throws the attacking force into extreme disorder, and a successful counter-attack at any given point, even if delivered by a small body only, will greatly militate against the enemy's success at the main point. Such action must be regarded as a duty by all commanders.

If the defence fails, the position must, of course, be abandoned; but, as fixed rules cannot be laid down for conducting retirements under pressure of the enemy, everything must depend upon circumstances and upon the resourcefulness of the officer in command. To gain time and put a distance between themselves and the enemy should be the first care of the retiring troops. As a firing line can fire better taking up a position than while on the move, it should, therefore, be withdrawn by sections at a run. This procedure should be sanctioned by the regulations, and taught to the troops in time of peace, so that in war they may look upon it as the correct method, and not as a scamper to get away from the enemy. Our regulations, however, lay down that a line must retire at a walk; but a line retiring in this manner under modern conditions of fire would have very few men left.

It cannot be doubted that a retirement at a run, followed by fire from a suitable position, would give better results than a retirement at a walk accompanied by fire on the move. The following sketch gives a fair idea of the moral condition of defeated troops who have probably lost their officers. The line retires at a walk, each man thinking only about getting as quickly as possible to some ditch or mound, where he can obtain cover.

To decide who is to halt and fire is a very difficult question. Suppose that one bolder than the rest does so; he will either find himself alone or one of eight or nine men, at most, out of a whole company. The knowledge that he is alone, or at best one of a few only, and that his comrades are going off, will shake his nerve, and spoil the effect of his fire. It is quite a different matter if a whole section of the company rushes back 200 paces and then opens with volleys or magazine fire; the feeling that their comrades are at their side will give the men confidence, the impression of failure will be lessened, and the fire will be more accurate. The sound of their comrades' fire will encourage those who have still to make their rush, and such fire will cover the retiring sections better than individual firing on the move. During the reconnaissance of the advanced guard of the 2nd Corps on the 25th April at Koyusnia, the Japanese successfully retired at a run by half companies. It may be argued that only highly trained troops could be kept under control in such circumstances; but, in recommending this practical method, which has been successfully tested in battle, I had in mind the fact that all Russian troops are highly trained, and that if the system indicated is taught in time of peace, units will not get out of hand in real warfare.

8. Infantry on the Defence by Night.

All the battles of the late war, especially those of Liao-Yang and Mukden, furnished abundant instances of night operations by in-

fantry; hence the main characteristics of night fighting have been thoroughly established.

The attackers, having the advantage of the initiative, will always be able to concentrate superior strength at the decisive point; consequently, given that the fighting qualities of both sides are equal, the final assault by bayonet should end in favour of the assailant. The latter will, moreover, base his actions on a preconceived plan, which the defenders, owing to the darkness, will be unable to fathom. Finally, the defenders are placed at a great disadvantage owing to the various means at the disposal of the attackers for diverting the attention, and thus drawing off the forces of their opponents. From the above considerations it appears that the chief requisite for a successful defence by night is to prevent the enemy from approaching close enough to attack with the bayonet. The sole means by which the defenders can effect this is fire, *i.e.*, the heaviest possible machine gun and rifle fire. Weak points in the position should be strengthened by machine guns, and the firing lines should be as dense as possible, so as to sweep with fire the whole of the ground in front of the trenches. When it is growing light, and aiming, even to a small extent, becomes possible, volley firing is most effective, because, in addition to the losses it causes, it shows the attackers that their opponents are well in hand, and consequently unshaken.

It is difficult to lay down rules regarding the visibility of targets at night; I presume that a sensible commander, having decided upon a night attack, would thoroughly study the ground, and then choose the darkest night, when a man's figure is invisible at 50 paces. In view of these considerations, and of the experience of modern battles, the first care of the commander of the defending force should be to strengthen his position with entrenchments and obstacles, including fougasses; to draw up a plan of defence and to acquaint the troops with the main points in it; and to make arrangements for the supply of ammunition. As soon as news of the enemy's approach is received from the outposts, strong firing lines must be told off. Each company should have its own supports, placed as close as possible to the firing line. The battalion reserves, in close formation, should be posted at weak points of the position, supplemented, if possible, by machine guns. The regimental reserve should be held in readiness opposite the probable point of attack, and near to the tactical key of the position. If the ground is much broken up, it is useful to split up the regimental reserve, especially if the position occupied is an extensive one. In this case any portion of the regimental reserve, reinforced by neighbouring battalions, should always be able to hold its ground until the arrival of other portions of the reserve.

Bold and reliable scouts should be sent out in front of the firing lines, and every precaution should be taken to watch the flanks. As soon as the enemy's advance is detected, the firing line should open a heavy fire, at first by volleys, and then by magazine fire, directed at the obstacles, if there are any, and if not, in the direction in which they would otherwise be placed. Such fire resembles that from machine guns, and has so far given satisfactory results. It is impossible to husband ammunition at this juncture. The maintenance of communication along the front of the position is most important in night fighting; company and battalion commanders should systematically keep themselves informed of what is taking place in neighbouring units. If, in spite of this fire, the enemy breaks through the obstacles, the

leading men will probably consist of a few of the more daring, followed by the firing line, after which will come formed bodies in close order. This is the time to throw hand grenades, the moral effect of which at night is terrific. The reserves should be ready at the threatened points to meet the assailants with a bayonet charge. In this manner the 1st Brigade of the 5th East Siberian Rifle Division repulsed 15 attacks by the Japanese at Kun-Tu-Li-Chun during five nights, from the 2nd to the 7th March, 1905. The brigade fired away 2½ million rounds during these fights. The only part of the defence which failed was that of the trenches of the 4th Company of the 18th East Siberian Rifle Regiment; the position occupied by this company was, however, an exceptional one for the following reasons:—

1. It was not strengthened by obstacles.
2. Its trenches were placed too far in advance of the general front of the position, the result being that the company was surrounded on three sides.

9. Infantry Fire Action.

Before closing my remarks on the fighting methods of a company and battalion I will say a few words on the subject of fire. On the offensive, as well as on the defensive, volley firing ordinarily commences at the longest ranges, up to the extreme range of the rifle. As the enemy is approached, or approaches, there is a change, first to individual, and then to magazine, fire. As has already been said, no particular result is to be expected from volley firing at long ranges; the effect will be chiefly moral.

Individual fire commences at 1,200 paces, and is capable of inflicting serious losses, since each man can take his own time in firing, and at 1,200 paces the lying-down position is usually adopted; that is to say, the conditions are identical with those laid down in exercises Nos. 7 and 9 of the Musketry Regulations.

Magazine fire, according to the experience of the war, commences at ranges between 800 and 700 paces, although there were occasions on which it was used at 1,000 paces. We were obliged to have recourse to this kind of fire (though at such a range it was not very effective), because the enemy frequently covered us with a shower of bullets. It was often employed by us in defensive fighting. During our offensive operations we adhered, from force of habit, to the regulation methods; we were, however, rather too sparing with our ammunition, in spite of the enemy's heavy fire; this was due partly to the difficulty of bringing ammunition close up to the firing lines, and partly to our inability to forget the instructions laid down in the regulations, namely, to advance as far as possible without firing. This was one of the causes of our heavy losses during our offensive movement on the Sha-Ho.

Magazine fire involves, of course, the greatest expenditure of ammunition in the shortest time,[1] and careful aiming is out of the question. These objections are not so apparent in the defence, because rests for the rifles can easily be provided; and the men, being under cover, are consequently calmer, and wait for the enemy to come closer, all of which considerations increase the accuracy of magazine fire, and com-

[1] On an average from 15 to 18 shots may be fired in a minute; but on occasions the fire was so rapid that the wooden parts of the rifle were charred.

pensate in some degree for lack of training in this kind of fire. The conditions in the attack are much less favourable; it will not always be possible to rest the rifle, and magazine fire will have to be resorted to, lying down, at a range of 700 to 800 paces. We were quite untrained in this respect, there being no suitable exercises laid down in the Musketry Regulations. Exercises 8 and 10 are applicable only to closer ranges (300 to 500 paces).

Magazine fire, which we often employed at ranges of 800—1,000 paces, is, however, most difficult, especially in the lying down position. When men are not accustomed to it, the slightest movement of the left hand will cause the bullet to fly high over the enemy's heads. I would therefore suggest the necessity for including in the regulations some exercises designed to teach the men how to hold their rifles straight and to become efficient "snap shots" when using magazine fire at 700—800 paces, especially when lying down. This is, unquestionably, a matter of importance, because magazine fire will in future be more frequently used in action than other kinds of fire.

(To be continued.)

STUDIES IN APPLIED TACTICS.

CAVALRY IN BATTLE (15TH AND 16TH AUGUST, 1870).

By P. LEHAUTCOURT.

Translated by permission from *Le Journal des Sciences Militaires*, By Major E. MAKINS, D.S.O., 1st Royal Dragoons.

INTRODUCTION.

GREAT as may be the importance of the events which have recently taken place in the Far East, those of the war of 1870 still retain immense value as well as teaching. In fact, in spite of their early date, they are in many ways nearer us than those of the Manchurian War, which is so unlike that which we may be called on to wage, perhaps in the near future. It is sufficient to recall, on this point, the great differences resulting from the theatre of operations, climate, extent of ground, and also the dissimilarity of the two combatants in the field.

Among the operations of the war of 1870, the most interesting from its extent, from its consequences and also from its nature, is that which begins during the 14th August by the passage of the Moselle, and ends on the evening of the 18th in the defeat of the right wing of the Army of the Rhine, followed in a short space by *our* investment under the walls of Metz. During these four days and a half the destiny of the Imperial *régime* and with it, unfortunately, those of France, was decided; and henceforth the issue of the war was a certainty, except for a miracle, which the patriotism of a Gambetta could alone have given birth to, if there had only been a national response. The first result of the Prussian victories round Metz was the realisation of German unity and the preparation for the introduction of the Imperial supremacy which was renewed in the centre of Europe.

Of all this period from the 14th to the 18th of August, that part from the 15th to the 16th has appeared to us more particularly interesting to study. In this treatise we have specialised the deeds of the Cavalry, acting in conjunction with the other arms. On the 15th and 16th, groups of squadrons, of very varying strength, can be chiefly seen confronted by tactical situations, which are very dissimilar and most instructive.

It does not seem impossible to deduce from these operations some lessons on the action of cavalry during the preliminaries of battle and during the action itself. In the course of previous articles we have often quoted an English proverb: "An ounce of practice is worth a pound of theory." This is especially applicable to the Military Art. Nothing is better than the proof of plain facts in order to establish the correctness of tactical procedure.

The Surprise at Montigny (*August 15th*).

Marshal Bazaine made the most insufficient dispositions for crossing the Moselle, and gaining the plateaux to the West. A sufficient number of bridges had been constructed, but no one troubled to see that there was any means of exit from them. The larger portion of the army got crowded together on one road, that which curves round by Longeville, towards Gravelotte, where it bifurcates into two distinct roads in order to reach Verdun: the most direct one passing through Mars-la-Tour; the other, slightly longer, bending round to the north *via* Doncourt and Etain.

No measures having been taken for the rational composition of this immense column, which was about to set out along this long defile from Metz to the plateau of Point-du-Jour, the confusion was immense. Forces of all arms, baggage trains, convoys wandered pell-mell, in a disorder which was increased by the counter marches, which the attack of our rearguard by the 1st Army made necessary for certain of our troops during the afternoon of the 14th—a great portion of the 4th Corps for instance.

This immense disorder was to be still further increased by the unexpected appearance on our left flank of a small detachment of the enemy. The Duke of Mecklenburg, who commanded the 6th Cavalry Division to the south-east of Metz, had formed this detachment of three squadrons (1st and 2nd of the 3rd Uhlans, and one squadron of the 6th Cuirassiers) and two guns, under the orders of Colonel von der Groeben, of the 3rd Uhlans.

The mission of this detachment was as follows:—

On the night of the 14th-15th at 11 p.m. the Commandant of the III. Corps, General von Alvensleben II., under whose command the 6th Cavalry Division had been provisionally placed, gave the following order: "The III. Corps will remain to-morrow in its present position. The troops will make arrangements to breakfast at 6 a.m. and be ready to fall in, or saddle up at any moment. The 6th Cavalry Division will continue its reconnaissance towards Metz."

It can be seen that the duty assigned to the Duke of Mecklenburg was very vague. It was not a question of making him participate in exploration on the left bank of the Moselle, exploration which presented a special interest, since it alone would permit of the discovery of Marshal Bazaine's intentions. By the phrase "reconnaissance towards Metz," Alvensleben evidently intended some operations of very limited extent directed towards the Lorraine fortress on both banks of the Seille. If Cardinal von Widdern is to be trusted, the commandant of the III. Corps did not leave the least initiative to his Divisional-General. Some verbal instructions, addressed to the last-named, obliged him to throw out his reconnaissances at daybreak: their composition was even provided for, down to the smallest detail, in a hard and fast way.

However this may be, the Duke of Mecklenburg interpreted as follows the intentions of Alvensleben:—

"(No place given) 14th August, 1 a.m.—In order to collect more complete information concerning the numbers and positions of the enemy after the great fight in front of Metz, the following detachments will advance at daybreak:—

"I. Colonel Count von der Groeben, with two squadrons of his regiment (3rd Uhlans) together with the Cuirassier squadron pushed

out along the Seille (his other squadron to be left on the left bank of the Seille, at Pournoy-la-Chetive, to guard the bridge) and two guns will advance at 5 a.m. from Pournoy-la-Chetive, *via* Augny to the road leading to Nancy, and, if possible, across the Moselle to the road leading to Verdun.

"II. Major von Hessberg (6th Cuirassiers) will leave at 4 a.m. with one squadron of Cuirassiers, one section of horse artillery (both from Verny), which will be joined by the squadrons (already detached at Fey) of Captains von Ploetz (15th Uhlans) and von Knoblauch (6th Cuirassiers), and will march *via* Pouilly along both sides of the Metz road, with the left, if possible, extending as far as St. Privat.

"III. One squadron of Uhlans (the 1st squadron of the 15th Regiment at Orny) will establish communication *via* Chesnay with the 18th Infantry Division (IX Corps).

"When these reconnaissances are finished these detachments will leave out small observation patrols and will report as soon as possible and in detail to Verny and to Chérisey."

The most interesting of these three reconnaissances, and the one which gave the best results, was that of Colonel von der Groeben. It can be seen how vague were the orders given him. Nevertheless, the orders to the 6th Division distinctly enlarged the task that Alvensleben appeared to reserve for the Cavalry, as they included the service of exploration to the West of the Moselle. But von der Groeben's detachment was too weak to risk itself uselessly beyond the river. Besides, if the Duke of Mecklenburg had really wished to extend his exploration so far he would have made use of the bridge at Novéant, which remained intact for the 6th Division. The guns of Metz would not have been able to break it, as they had done that at Longeville.

Equally it can be asked whether seven squadrons and four guns were sufficient to accomplish the task, even if restricted to the reconnaissance of the south front of Metz, which was the duty of the 6th Division. Under the same circumstances, it seems that we should act differently nowadays. We should send forward the main body of the Division in a given direction, preceding it with bodies destined to establish touch. It is remarkable that these three squadrons, although taken from two different Corps, did not contain a single man armed with a carbine, a circumstance which might present grave disadvantages for a detachment, thus risked far away, in a hostile country.

Von der Groeben left Pournoy-la-Chetive at 4.30 a.m. in a thick fog, which concealed his march, but which made him run the risk of falling into an ambush. He went on beyond Augny and found an unoccupied field work which had been commenced by us to the south of St. Privat.

His patrols penetrated even into two lunettes nearer Metz, *viz.*, those of the workshops of Montigny and La Horgne, still under construction, and neither of these were occupied. Three squadrons advanced towards the fortress, *via* the Augny road; the remainder with the two guns went to Bradin farm, to the S.W. of Montigny, where they remained in hiding, waiting for the fog to clear.

The first-named body passed through Montigny, where they captured a young officer and four men with a wagon of oats. Of these prisoners, one belonged to the 88th Regiment, *i.e.*, of Maussion's Brigade, of the 5th Corps, which was at this moment retreating to the camp at Chalons. It was only possible to explain his presence in Metz from the fact of the disorder reigning in the rearguard of the Army of

the Rhine. The others belonged to the 12th and 100th Regiments, *i.e.*, of Tixier's Division of the 6th Corps. Their capture possessed some importance, as the presence of this Army Corps in Metz was thus ascertained for the first time.

It was only to the North of Montigny, in the immediate neighbourhood of the enceinte, that the Prussian troopers were checked by infantry.

However the fog lifted. From Bradin farm, Colonel von der Groeben leisurely watched a French bivouac, complacently displayed to the West of the Moselle, right on the bank of the river between Longeville and Moulins. They thought themselves absolutely secure, and they suspected nothing amidst the surrounding calm. According to the inhabitants of the farm, all our bivouacs on the right bank had been evacuated the night before, and the bulk of our troops had taken the route towards Verdun.

In short, the reconnaissance had already gathered some positive information: the absence of French troops on the approaches south of Metz, and the move which was taking place from Metz on Verdun. Nevertheless, Groeben did not rest satisfied. He brought his two guns into position to the west of the farm and opened fire on our camp. He could have had no other intention except to create a great disturbance without being able to score an immediate success. But on the other hand his retreat was assured to the south of Metz, and his demonstration could not interfere with his own detachment, since he had completed the essential part of his task. It is then only possible to approve of his action.

As it was the two Prussian guns fired 48 shells at distances estimated between 1,740 to 2,240 metres. "The result was too amusing for words," writes von der Groeben in one of his reports; "the shouts and confusion lasted until the St. Quenten fort from behind the veil of fog opened fire on the Bradin farm . . . ." Meanwhile the fog had entirely disappeared: the detachment thought it prudent to take cover behind a neighbouring plantation, that which still exists on the actual manœuvre ground of Frescat. Previously it had cut the railway at the Montigny bifurcation, thus exceeding its programme.

It was Tixier's Division of the 6th Corps which was thus surprised. Having come to the south of Metz in the evening of the 14th, it halted on the Moselle, immediately to the west of the railway bridge at Longeville which it had used to cross over by.

Not only had it not left a rearguard on the right bank, but it had not even left a guard over the approach to the bridge from the East. The Prussian shells inflicted on the Division considerable losses, amongst whom was the Colonel of the 10th Regiment, Ardent der Picq, the well-known author of "Etudes sur le Combat." For some time there was great confusion. It was a panic: "Tents were overturned, the piles of arms upset; a good many soldiers, half equipped, ran as hard as they could, and took refuge in a little wood on the bank of the river . . . ." So little did we anticipate an incident of this kind, that none of Fort St. Quenten's guns could shell Bradin farm. It was just possible to turn one 10 in. gun on to Rozérieulles and fire two shells, which stopped the Prussians' fire, but without doing them any harm. The intervention came too late, but the Emperor considered it worthy of a "shake of the hand" in his name for the artillery lieutenant who had done it. Colonel von der Groeben was then able to retire on the 6th Division with his detachment intact, having caused

us considerable losses, and, above all, having inflicted a moral shock, the importance of which we shall appreciate later.

About the same time another skirmish occurred to the east of Montigny at Sablon. As we have seen before, while von der Groeben was moving *via* Augny on the first of these points, the Duke of Mecklenburg detached from Verny towards Metz a force of the same strength to reconnoitre the approaches to the fortress. Major von Hessberg marched at 4 a.m., and leaving two of his squadrons in St. Privat, pushed the 3rd (5th Squadron of the 6th Cuirassiers) to the north of the railway (Metz-Saarbruck). After having had a few shots fired at them while passing through Sablon, the handiwork of stragglers or inhabitants, the Prussian horsemen arrived at that part of the environs of Metz which cover the railway station. Here they were checked by infantry fire.

Their apparition alone had put to flight, not only a large portion of the inhabitants, but also the Engineer Field Park, composed of fifty wagons still on the right bank; it is impossible to understand to what aberration of mind this was due. These impediments returned to Metz in haste. As no force held this portion of the enceinte, the commander of the Engineer Park had given rifles to 300 workmen from the arsenal and posted them just outside the enceinte. The commandant, General Coffinieres, being warned, sent forward a company drawn from the details of the "Chasseurs-à-pied," and then some battalions of the "Garde mobile." In the end he detained for several hours a Brigade of Grenadier Guards, and sent a panic-stricken message to Marshal Bazaine: "Metz is seriously attacked from the direction of the railway. Impossible to muster the National Guard, some of which, being scattered and without officers, cannot be got hold of. To give me time to reconnoitre I am keeping a Brigade of Grenadiers. . . ." Such was the effect of three squadrons and two guns!

Major von Hessberg took up a position with his two guns and opened fire first of all on a train on the railway where some infantry lay concealed, and afterwards on the town. The guns from Fort Quenten silenced him at last, and his detachment retired without any further incident on Verny, having, like that of von der Groeben, obtained quite appreciable results without difficulty.

The panic, caused by these two demonstrations, was not confined to one Division of the 6th Corps and the garrison of Metz. At the moment when von der Groeben fired his first gun, Napoleon III. was leaving Longeville, where he had passed the night. The second shell fell in the park next the house where he had stayed. It is said that he cried out: "We are betrayed," then: "Where is the Prince Imperial?" "In order to avoid the confusion, and not to add to it himself," he went off at a gallop, taking the old Roman road, which goes *via* Sey, Sissy, Châtel St. Germain and Point-du-Jour a little way off and parallel to the main road, and rises up the slopes to the right. But in a few minutes there was another shot, this time to the west and in the direction which the imperial cortége was taking. In order not to fall from "the frying-pan into the fire," the Emperor halted in front of the farm of Point-du-Jour, and there remained during the engagement which we are about to describe, viz., that of Forton's Cavalry Division at Mars-la-Tour. After that he went to Gravelotte. His baggage, which followed him, hindered the general movement. "The wagons, extremely numerous, went as hard as they could along the

Verdun road; the teams and escort at the gallop; this avalanche passed right through our batteries."

In spite of his natural coolness, Marshal Bazaine did not escape the contagion. Before leaving Moulins, where he had slept, he gave the order to destroy the Longeville bridge. It has since been said that he was afraid that we should be cut off from Metz, "the enemy commencing to concentrate on us," and he wished to avoid "another rearguard action," unavoidable if our adversaries seized this point of passage. In order to appreciate these reasons at their full worth, it is necessary to remember that the bridge was covered by the guns of Fort St. Quenten and the enceinte, at less than two and a half kilometres distant. We thus destroyed a point of passage, which the enemy could not have made use of, and which would have been most useful to us, if only for the defence of Metz. On the 26th and the 31st August, the army, when it recrossed the Moselle, on all sides deplored its disappearance. During the remainder of the siege they will work hard to rebuild it; but only the enemy will make use of it in order to send to Thionville the French siege train, taken from the Arsenal at Metz.

It was the Engineers of the 3rd Corps who blew up one of the arches about 9.30 a.m. But the destruction was incomplete and some people on foot were still able to cross over on its ruins. Marshal Bazaine, on being informed of this, ordered the destruction of a second arch, which took place about 5 p.m. For many hours no Prussian Cavalry soldier had been in sight of Longeville.

Thus six squadrons and four guns divided into two detached groups had been able to reconnoitre the immediate approaches of Metz from the south, to inflict losses on us, to throw a portion of our columns into disorder, and to lead us on to early ruin. These results had been obtained with the greatest ease, almost without loss; thanks, it must be confessed, to the absence of the most simple measures of security on our part. If the garrison of Metz had covered the approaches of the fortress, as it ought; if Tixier's Division had also covered itself with outposts thrown out on the right bank of the Moselle, not only would the results of this double reconnaissance have been less marked, but the squadrons of von der Groeben and von Hessberg might have easily suffered considerable losses. It is then to our failings more than to the skill of our opponents in execution, that the results, which were obtained with little expense by the enemy, must be attributed.

II.

Bombardment of Mars-la-Tour (*August 15th*).

While the Army of the Rhine set out slowly towards the plateau of Gravelotte, it was covered, from the evening of the 14th, by two Divisions of Cavalry, viz., General du Barail's 1st Reserve Division, pushed forward on the Etain road, and 3rd Reserve Division of General the Marquis de Forton, on the Mars-la-Tour road. The latter had spent the night at Gravelotte.

It is a remarkable fact that although Marshal Bazaine had thought of covering his army in front during the move from Metz to Verdun, yet he never thought of covering its left flank, notwithstanding that it was seriously threatened. The least that he ought to have done was to have guarded strongly the passages of the Moselle to the south

of Metz, and then to have formed a strong flank guard, following to the south of the Mars-la-Tour road the march of the army. There is nothing to show that this had even crossed his mind.

But to return to Forton's Division.

In the early morning some inhabitants had reported the presence of the enemy in the valley of the Moselle towards Ars. There was a mass of cavalry at Novéant. The evening before, when he had arrived, General de Forton had been warned by the Gendarmerie and by the inhabitants that the enemy occupied Chambley, to the south-west. Some Cuirassiers, Hussars, and Dragoons, with artillery, might have been at Mars-la-Tour, to the west. Although these reports were probably greatly exaggerated, they were not unreasonable, and were worth verifying in any case. General de Forton knew that during August 12th a body of German cavalry had arrived at Pont-à-Mousson, and had surprised and defeated General Margueritte's "Chasseurs d'Afrique." It was not to be wondered at, if, on the 14th, there were traces of this cavalry to the west of Metz. Forton does not appear to have bothered himself, and limited himself to making round Gravelotte a few reconnaissances of very short radius, in accordance with our deplorable custom in those days.

On August 15th, about 5.15 a.m., his Division started for Mars-la-Tour by the Verdun road. A squadron of the 1st Dragoons acted as advance-guard, another of the 9th Dragoons was on the flank to the south of the main road, but both were pushed out quite a short way. The column, marching very slowly, thus passed through Rezonville and Vionville. On reaching the crest immediately to the west of this latter village, General de Forton noticed a great deal of dust in the plain between Mars-la-Tour and Puxieux, to the south-west. He detached at once the remaining three squadrons of the 1st Dragoons with orders to support the advanced squadron and halt to the west of Mars-la-Tour, and at the same time to search the ground between this village and Puxieux. Then, having seen further movements and smoke, he sent General Prince Murat with the three other squadrons of the 9th Dragoons in the same direction. The Cuirassier Brigade, with the two batteries, followed along the Verdun road at the same slow pace as before.

The 1st Dragoons had learnt from its scouts of the presence of the enemy's horsemen in the direction of Tronville. The regiment inclined in this direction to the south of Mars-la-Tour, and soon saw before them a body which they estimated at one regiment. It was two squadrons of the 11th Hussars, which had arrived in the morning to the west of Rezonville and who retired before the Division. We shall see later their move in detail.

The 1st Dragoons pursued them to the west of Puxieux, where they were reinforced by the 9th Dragoons. Prince Murat's brigade was thus reformed. But the enemy was strongly reinforced, and a battery opened fire from the north-east of Xonville. It was thought that infantry could also be seen close by, although there was none there. The records of the 9th Dragoons state that "Some moments after, two imposing columns of Cavalry and Prussian Infantry could be seen following a course parallel to a battery of Artillery which marched between them." As a matter of fact, there was no infantry marching with Redern's Brigade.

It may be seen how cautiously we should act on observations made from a good way off and under the effect of preconceived ideas, as in

the case of the Dragoons. Thinking that their adversary would act in the same way as ourselves, they believed his cavalry incapable of risking itself so far from the Moselle without the support of infantry. From this idea came their illusions.

As it was, Murat's Brigade retired on Puxieux and Mars-la-Tour, where it joined Gramont's Cuirassier Brigade and the two batteries with General de Forton. These had advanced with such prudence that, having left Gravelotte at 5.15 a.m., they reached Mars-la-Tour between 9 and 10 a.m., having taken at least four hours to go eleven kilometres. Learning of the enemy's approach, the General placed his two batteries in position to the west of Mars-la-Tour, and protected them with the Cuirassier Brigade.

When the Dragoons arrived he placed them to the left of the guns and the Cuirassiers to the right. Then he patiently awaited the Prussian Cavalry, without thinking of taking the offensive, for which he had, at least for the time, a real numerical superiority (15 squadrons and two batteries against nine squadrons and one battery, increased afterwards to 15, and then 19 squadrons).

As regards General von Redern, he limited himself to engaging his battery against ours. During this exchange of shells, which lasted about an hour, our squadrons, masked by a line of trees and by a fold in the ground, suffered no loss. The opposing batteries were not a bit more affected by our fire than we were by theirs. Nevertheless, that of the enemy was manifestly inferior and cut short the contest. Its fire had been most inaccurate.

Redern's squadrons and battery retreated on Puxieux, where we thought we saw infantry, being under the same delusion as before. Forton was content with observing, from afar, this retreat in spite of the arrival near him of important reinforcements.

Du Barail's Division, then about Jarny, had been warned by Forton and made its appearance between the Grange Farm and Mars-la-Tour. General de Valabreque, who commanded the Cavalry Division of the 2nd Corps, sent also the 7th Dragoons into the interval between Vionville and Tronville. Although Redern's force might have been reinforced by all the bodies of Cavalry operating round about, yet we had even then a certain numerical superiority (34 squadrons and four batteries *v.* 29 squadrons and two batteries). Forton did not attempt to take advantage of it. Meanwhile, General Frossard, commandant of the 2nd Corps, had arrived at Rezonville. Forton informed him that "he could hardly hold on to Mars-la-Tour, and if he was attacked that he intended to seek a *point d'appui* in rear." Frossard had not the 3rd Division under his orders, and he thought that he ought to restrict himself to advising Forton to occupy "a position which would permit him to fulfil his rôle of divisional advance guard." It can be seen that he, in the same way as Forton, had the most peculiar ideas on the employment of the Army Cavalry. If it had been a question of an infantry advance guard, both of them would not have expressed their ideas differently. Why did Forton think that his rôle was to hold Mars-la-Tour, which was neither the head of a defile nor a bridge-head? Would not the best means of checking the enemy have been by attacking him instead of proceeding to retire to a position in rear, an occupation which is not in the least the business of cavalry? Neither Forton nor Frossard took in account that rapidity of movement is the chief characteristic of that arm, of which these squadrons were composed. The similar ideas both these men had

recalls a term which is not still in use: that of "Fortress Cavalry." The following morning was not going to belie these premises.

Instead of trying to pierce the screen which the German squadrons already extended between us and Redern, Forton retreated towards the east, after having halted round Mars-la-Tour up till 1 p.m. His Division bivouacked to the west of Vionville, in the immediate neighbourhood of that of General de Valabreque and of the rest of the 2nd Corps, which was halted between that village and Rezonville, on either side of the Verdun road by Mars-la-Tour. Marshal Bazaine has said that the action of Forton's Division was "feebly conducted, and the cause of the blockade of Metz." This is a great exaggeration and an attempt on the part of the veteran commander of the Army of the Rhine, as was his wont, to hide his own responsibility behind the mistakes of others. But it appears undeniable that General de Forton gave evidence of a singular lack of energy, and that, on the whole, the 15th August, 1870, was not a creditable day for our cavalry.

The commander of the 3rd Division saw plainly the mistake which he had committed in retreating behind the bayonets of the infantry, and tried to justify his action by means of most inaccurate statements. In the first of his reports devoted to the *rôle* of his Division on August 15th and 16th he writes: " . . . . a considerable number of skirmishers began to advance against our vedettes. Judging that they were about to be followed by their battalions, I reported my position to General Frossard, and on his advice I withdrew my division. . . . " Although this last assertion appears contradictory to what the commander of the 2nd Corps wrote, Forton reproduced it in another report, dated September 9th. As regards the infantry, whose skirmishers apparently threatened to attack Forton's Division, it is difficult to take it seriously; the chief reason being that there was no German infantry within a radius of several kilometres.

Following a constant practice at that time of our troops, whether they were far distant from or near the enemy, Forton's two brigades and artillery bivouacked on the outskirts of Vionville, imperfectly concealed from the enemy by a ridge which cut the Verdun road at right angles. The regiments of Prince Murat were in two lines to the west of the village, the 1st Dragoons in the first line, the 9th Dragoons in the second line, and the artillery formed a third line. The Cuirassier Brigade was to the north of the road, and a little in front and to the left of Murat's Brigade. Forton's four regiments did not pitch their tents, nor did they off-saddle.

Concerning this, it may well be asked whether the cavalry should have bivouacked on the night of August 15th-16th. Doubtless the enemy was in close proximity, and the usual custom is that troops do bivouac under these circumstances; but it is right to state that the German infantry had not yet appeared; the situation being as it was, it appeared hardly probable it could be on the line of retreat followed by the army of the Rhine. For this reason it was only an attack by cavalry and artillery, which the Division need have feared, a kind of dash like that of Athies in 1814, made either at dusk or at dawn. In order to resist this, it would have been more advantageous to have billeted than to bivouac, for a cantonment is more easily defended than a bivouac, more especially in the case of cavalry. In similar circumstances, surely anyone would pass the night in a

cantonment-bivouac at Vionville or at Tronville, throwing out sufficient outposts, and saddling up at dawn.

One fact is certain, that at Vionville, Forton's Division was not in a position to play its rôle of Army Cavalry. It was in close proximity to the 2nd Corps, which it only covered very insufficiently, and moreover to the front only. The left flank, which was the most threatened, was not protected in any way by it, nor by any other force of any importance.

The consequences of this mistake were much more serious as the service of security arranged by Forton was absolutely rudimentary. Five picquets were posted round his division, and thrown back to either flank on the outposts of General de Valabreque. The 7th Cuirassiers furnished two of these, "each about the strength of a troop," the one on the right thrown back on another of the 4th Chasseurs (Valabreque's Division), this latter again being in touch with the infantry outposts of the 2nd Corps. The 10th Cuirassiers had one post of a troop to the left of the above, to the north of the Verdun road and to the east of the Tronville copses. These three picquets were ordered "to especially watch the narrow approach from the woods to the crest of the ridge,"—an order, which, without doubt, must be considered as insufficiently clear. Their left was in touch with the two picquets of Dragoons, the first one (two troops of the 1st Regiment) to the south of the Vionville-Tronville road, watching the ground between Tronville and Mars-la-Tour; the other one (troop of the 9th Dragoons on rising ground of the Vionville cemetery), throwing its left back on a picquet of the 7th Dragoons (Valabreque's Division), which again was thrown back on the infantry outposts of the 2nd Corps.

There is no need to point out that their measures for security were very imperfect. The line of outposts was very close to the bivouac, a few hundreds of metres or so distant. The picquets of the Cuirassiers, being without carbines, had no defensive power, and their efficiency was very restricted for that reason. All of these were in the immediate neighbourhood of the woods of St. Marcel and Tronville, or of the last named village—all three of which afforded cover for the enemy, less than 1,800 metres from Vionville, and were ready made for allowing the enemy to approach without being noticed. These defects were so apparent, that General de Forton tried to remedy them to some extent. When the night had fallen, he doubled all the Cuirassier posts with Chasseurs from Valabreque's Division (4th Regiment). A post of 20 Dragoons, on foot, as in the former cases, was pushed out into the angle formed by the Verdun road with that from Tronville, and level with the neighbouring picquets. Then, during the evening and the night, reconnaissances and patrols reconnoitred "a great way to the front." At least that is what Forton's report of September 9th says. In reality they reconnoitred to the front so feebly, that Tronville, only 1,200 metres away, remained outside their sphere of action. It was a company of infantry scouts, under Lieut. Devaurieux, who reconnoitred this village on the morning of the 16th. The Cavalry had not adventured so far! As regards other places further off, as Mars-la-Tour, Puxieux, Gorge, Ars-sur-Moselle, all of which were so dangerous owing to their situation behind the screen of woods very close to our left flank, not one of them beheld a single French cavalryman during the evening or night—except as a prisoner.

Under these conditions, the bivouac of the Division, a part of which was spread out in full view to the West, was singularly exposed. There was no lack of ominous warning. Repeatedly during the night, shots were fired on our patrols or vedettes. The 7th and 10th Cuirassiers thus sustained a few casualties, and General de Gramont thought fit to shift his brigade camp 800 metres further back, and placed it to the north-east of Vionville, with its left flank resting on a part of Valabreque's Division, which, in its turn, was bivouacked to the east of Vionville, and on either side of the main road.

Gramont's Brigade in its new position was slightly better concealed from view; but the two regiments of Dragoons remained all the same to the west of Vionville, imperfectly concealed by the rising ground which is immediately between that village and them.

While Forton's Division timidly fell back to the west of Mars-la-Tour, as we have described, General du Barail got the order to march on the road to Etain, as the instructions of August 13th prescribed. He was to halt at Jarny.

After a skirmish, he had just arrived about 10 a.m., when guns were heard to the south-east. It was Redern, whose battery was engaging those of Forton. Du Barail immediately relieved the horses of part of their loads,[1] which overweighted them, and marched rapidly to the sound of the guns. On his way, he met an officer, sent by Forton to ask for assistance, and he quickened his pace still more. When his Division had arrived near Mars-la-Tour, the firing had already ceased, and the enemy had disappeared. He then returned to Jarny, but not without giving chase to some of the enemy's patrols, and taking some prisoners.

In his Memoirs, written with so much spirit and "humour," the General talks of the actual capture of a hundred troopers. This estimate must be greatly discounted. It was only a question of seven, so far as anyone saw. This feeble capture was the only result of the happy initiative of du Barail, who accomplished that which is at once so simple and so rare, viz., of marching to the sound of the guns, without awaiting orders and in order to help a comrade in difficulties.

The Division, when at Jarny, to which place it returned, was in front of Forton, when the latter retreated on Vionville. Du Barail thought it necessary to take back his Division to Doncourt, level with this village. The Division bivouacked, covering the baggage of the 4th Corps, which had got ahead of the rest of the Army Corps. A sharp fusillade was heard during the evening and part of the night near the Chateau de Moncel and the Breullot Mill, where some enemy's patrols had doubtless appeared. A squadron of the 2nd Chasseurs d'Afrique was in consequence sent there.

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[1] Our horses used to carry in those days some hay in nets as well as an extremely heavy valise and a ration of corn.

(To be continued.)

MAP REFERENCE.

By Major J. A. S. TULLOCH, R.E.

THE present orders regarding references to places on the map are contained in Combined Training, Section 7, Framing Orders and Messages, sub-para. VII., which is here quoted for ready reference.

"If a map is referred to, the one used must be specified. The position of places will, as a rule, be denoted either by the points of the compass, *e.g.*, "wood 600 yards S.E. of Tetsworth," or by descriptions, *e.g.*, "point 276 yards close to the second "e" in Haseley," the letter indicated being underlined."

It would appear, therefore, that it is the intention of the General Staff to issue unsquared maps in war time. If, by using squares or parallelograms, we can ensure greater accuracy and greater rapidity of reference, then it is reasonable to ask for a reconsideration of the above orders.

2. *Accuracy.*—Now, although the above system is generally accurate, it may lead to error where there is more than one place of the same name on the map, or when for any reason it has not been possible to mark down all names and detail on the map.

Plate 6 is a map of existing country, showing names of villages, etc., as they actually occur.[1] If a report were received on service that a force of the enemy was encamped one mile due west of Sooltanpoor, it would not be possible to locate the actual spot without further information. It must be remembered that the officer making the report may have his map folded up, and may not notice that there are several Sooltanpoors on the map. The person receiving the message may see the wrong Sooltanpoor, and may be entirely misled and draw false conclusions. If the message sent in was "Enemy encamped 9 E. 2" there could be no possibility of error. The reference 9 E. 2 will be explained later on in this article (para. 8).

To show that this is not an improbable case, the following examples may be cited in support:—

In the South African war the advance to Middleburg was delayed owing to General Ian Hamilton's column having gone too far north and taken the wrong route. "The mistake arose from the existence of two farms of the names of Boekenhoutkloof, about 8 miles from one another. The guide led Ian Hamilton to the wrong one." (*Times* History, Vol. IV., pp. 481-2.)

In the Russo-Japanese war it would appear that the disaster to General Orloff was due to defective maps of the country north of Liao-yang. On the Russian maps few villages were marked, and the natural consequence was "endless marching and counter-marching through the critical days of 1st to 3rd September." It is possible

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[1] A portion only of this map is completely filled in.

that Orloff was directed to a certain village, got there as he thought, and found it was another village of the same name.

Now, both of the above errors might have been avoided by the use of squares. If the farm Boekenhoutkloof (Square Q10) had been named, it would have been obvious, if the guide was leading to some other square, say M6, that he was going wrong. Similarly with Orloff's case.

It is therefore submitted that the use of squares will lead to greater accuracy than the present system of reference is capable of, *provided always that the correct square is referred to in every case.*

3. *Rapidity.*—The next point is the question of rapidity. This needs no proof as far as the actual message is concerned, for it must be admitted that it is quicker to signal "point 276. Q6" than to signal "point 276 close to the second "e" of Haseley." *Delay may occur, however, in finding on the map the actual square to be signalled.*

4. We must therefore overcome the following possible sources of error and delay in using squares for reference, namely:—

1. The possibility of quoting the wrong square.
2. Any delay arising from having to find the correct letter or number of the square.

5. The usual method of dividing a map into squares is by means of letters and figures. The letters are generally marked at the top and bottom of the map, and run alphabetically from left to right. The figures are shown at the sides, and run numerically from the top to the bottom.

Much trouble is entailed and inaccuracy engendered, from having to open out the map, to find the letter and number of the square. It must be remembered that the reference may have to be made on horseback, in rain, or in a high wind; if in a balloon, in a gale; if in a motor car, when moving at speed, and so forth. It is quite easy with the above method of marking squares to lose time finding the square, and then to put down the wrong square.

Printing in ink or writing in pencil rows of letters or numbers all over the map, only covers over names and detail, or dirties and smudges the map, thereby causing delay and inaccuracy in references. This method, however, saves having to open out the map if a sufficient number of squares are marked on it.

For accuracy and speed of reference, therefore, each square should be actually marked on the map, or so defined:—

(1) That it will not be necessary to open out the map to find the square; and

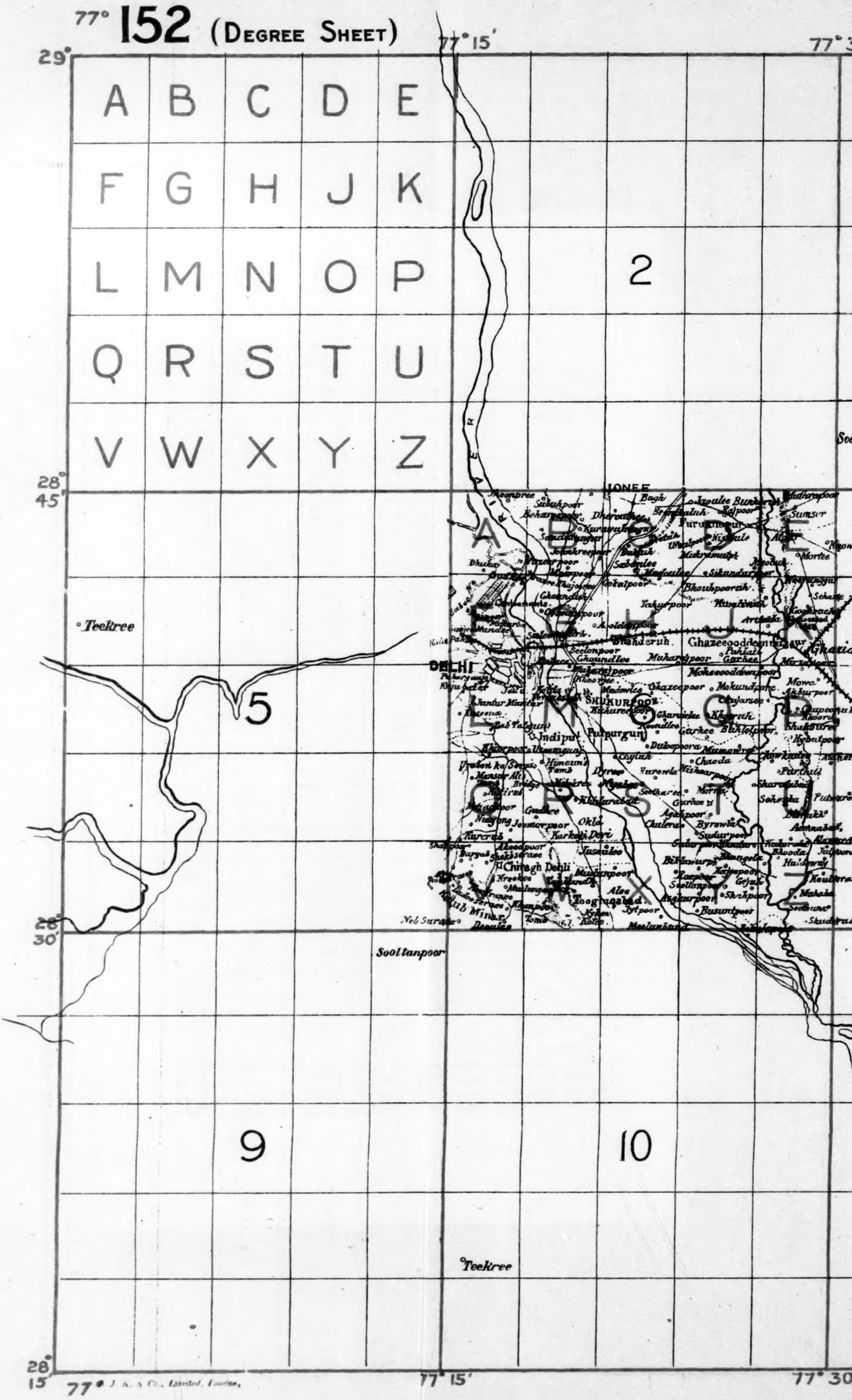
(2) That the marking will not obliterate features, names, etc.

6. These requirements can be fulfilled if some uniform method of numbering, etc., is agreed upon. It is suggested that the system about to be inaugurated by the Survey of India Department is one which might be universally adopted. It is the intention of this Department to issue degree maps at a scale of 1 inch = 4 miles, and to subdivide these into 16 standard sheets at a scale of 1 inch = 1 mile. Each degree map will be numbered, and will include the ground contained by one degree of longitude and one degree of latitude. Thus, 52—5 will mean the 5th sheet of the 52nd degree map. To number the degree maps throughout the whole world on this system, though feasible, would not be sound, as we would get maps with numbers

Journal R.U.S. Institution.
Vol. LII.

DIAGR

Scale 4 Mile



J. & Co., Limited, London.

RAM I

iles = 1 inch.

PLATE 6

77° 30'

77° 45'

78° 29°

28° 45'

28° 30'

28° 15'

Cant Star

City Star

MEERUT

3

4

7

8

11

12

N. W. RAILWAY

E. I. RAILWAY

Dadri

BOOLAND SHAHAR

Khurja

Sooltanpoor

Khoomkpoor

Ghaziabad

running into five figures, thus making references long and difficult to make. It must be borne in mind that an officer has generally to remember the number of his map, and cannot always be turning to the actual figures for reference. It would probably be better to number the degree maps in each possible theatre of war; thus, Europe would be easily covered by 1,500 sheets; India and the adjacent country could be brought into less than a 1,000 sheets, and so forth. In this case every map issued would have to be specially numbered.

It should, however, be possible to so number degree maps throughout the whole world as to make it possible for an officer to number any map correctly. The whole world is divisible into 4 quarters E. and W. of the Greenwich meridian, and N. and S. of the equator, and each of these quarters might again be subdivided in 4 parts. Each of these parts would contain 5,400 degree maps. If in each of these divisions the degree maps were numbered from the left-hand top corner down and up alternately no confusion would occur, and the correct number of any map or any portion of a map, including ground lying between any degree of latitude and longitude, could be easily arrived at.

7. But whatever general system is adopted for numbering maps, it is with reference to further subdivision that this article is written. It has been stated previously that each degree map is to be subdivided into 16 standard sheets. This being so, it will only be necessary to consider how to subdivide these sheets. Plate 2 shows a portion of a degree map of the country lying between 77°—78° longitude E., and 28°—29° latitude N. This is subdivided into 16 red squares, showing the standard sheets.

Suggested Plan.—Plate 1 shows a standard sheet (scale 1 inch = 1 mile) subdivided into 25 squares, lettered A to Z (leaving out the letter I). Each square thus represents about 3 square miles of country.[1]

These squares are marked in thin black lines across the sheet. Again, each of these squares is subdivided into 9 squares, marked in thin red lines. These are not numbered on the map, but as each letter square only holds 9 squares, the latter can always be counted when a reference is necessary. These smaller squares represent, roughly, about a square mile of country.

These number squares are too large for accurate reference, *e.g.*, for directing artillery fire. For this purpose it is suggested that officers and others should carry a small piece of talc or tracing paper in their

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[1] It is important to remember that the squares would vary in size in different sheets, because a degree of longitude varies as we go north from the equator. Thus, at 40° latitude 1° of longitude is about 53 miles. At Cape Comorin 1° of longitude is about 64 miles. Therefore, it would always be necessary to measure distances by scale, and not to assume that the sides of each square always represented a fixed value. Thus, a standard sheet might be $\frac{53}{4}$ by $\frac{69}{4}$ inches (1° of latitude, of course, always remains the same), *i.e.*, 13¼ inches by 17¼ inches. This would be divided into 25 squares, and the sides of the squares on the map would be (the scale of the standard sheet being 1 inch = 1 mile) 2·65 inches by 3·4 inches. At Cape Comorin the sides of these squares would be 3·2 inches by 3·4 inches.

note books or attached to their map. On this would be marked a square containing twenty-five quarter inch squares, thus:—

a	*b*	*c*	*d*	*e*
f	*g*	*h*	*j*	*k*
l	*m*	*n*	*o*	*p*
q	*r*	*s*	*t*	*u*
v	*w*	*x*	*y*	*z*

These squares should be known by letters exactly as the squares into which the standard sheets are primarily divided. Small letters might be used for written references, and these letters can be easily marked on the talc. All an officer would then have to do would be to lay this on one of the red number squares on the standard sheet and read off the square in which the place for reference fell.

Salaka might be referred to as SALAKA 13 F.3. (Plate 7).

But if greater accuracy was necessary and artillery fire was to be brought to bear on the enemy's battery north-east of Salaka, the reference would be: "One battery 13.F.3.r." The artillery commander could signal: "2nd Brigade Division fire on 13.F.3.r." For still greater accuracy the points of the compass could be referred to thus: "One battery NE. of 13.F.3.r."

8. It would not to do to show the smaller number squares on the degree maps (Plate 6), as they would cover over the detail too much; but if the letters A, B, C are made to fit exactly the centre imaginary number square, anyone could easily tell quite near enough where the place referred to fell. Thus, an officer would report (Plate 6): "Enemy encamped Sooltanpoor 3 V5 or 6 Y.4., or 9 E2" (*see* para. 2 ante), as the case might be. In this case a piece of talc with 9 squares marked on it would be used (*vide* standard sheet 1, square A); but owing to the variations in the degrees of longitude a fresh set of squares would have to be made for each degree map (north or south).

9. It would, of course, be very much better if maps were issued with the squares marked on them; but if it be contended that the expense would be too great, then each officer could easily mark out the squares on the map issued to him. He should, of course, take a little care over it and use good ink or a hard, fine pencil, so as not to smudge over detail. In the case of a degree map, all that is necessary is to divide it into 16 equal parts, each of these parts being again subdivided into 25 squares lettered A to Z. By the use of tracing paper the corners of the centre of the 9 squares into which the letter squares are divisible might be pricked or marked on the map, and the letters could then be printed to size (but see note 1 below).

In the case of the standard sheets (1 inch = 1 mile), after dividing the sheet into 25 lettered squares, the officer would divide each of these into 9 squares (red ink), and, with the talc arrangement previously referred to, could locate any point on the map within 150 yards or so. This would be accurate enough for artillery to begin ranging with.

Journal R.U.S. Institution.
Vol. LII.

152 _ 13

DIAGRA

Scale 1 inch =

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AM 2

= 1 mile

(STANDARD SHEET 1/6 OF A DEGREE MAP)

C			D			E	
H			J			K	
N			O			P	
S			T			U	
X			Y			Z	

a	b	c	d	e
f	g	h	j	k
l	m	n	o	p
q	r	s	t	u
v	w	x	y	z

10. In using the degree map by marking the letter N or centre square of each standard sheet with the number of the sheet (as shown on Plate 6, on all the standard sheets except the first), the only effort of memory required is to remember the number of the map. After that everything is plain sailing. The map can hardly be folded so small that some standard sheet number is not visible. The letter square can be read off and the number square can be guessed by eye. Thus the correct reference to the L of DELHI is 152—6—L—1 and to the DE is 152—5—P—3.

In using a standard sheet it would be necessary to remember the number of the degree map and the number of the sheet, but this no more than is necessary under the system of reference laid down in Combined Training. The letter[1] square is marked on the sheet, the number square can be counted, and for greater accuracy the talc[2] square can be laid on any number square and the small letter square read off.

11. There is no doubt that some system of squares will be largely used by artillery in any big battle. The Japanese used squares on their maps for this purpose. At Liao-yang by means of the telephone and squared maps the Russians directed their artillery fire on such and such a square. It seems only right, in order to ensure rapid co-operation between the infantry and the artillery, that each arm should use the same system.

It is claimed that the above method has the following advantages over the present system of reference mentioned in the beginning of this article:—

1. Greater simplicity.
2. Greater accuracy.
3. Greater rapidity.

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[1] It is, as a matter of fact, unnecessary even to letter the squares in the degree sheets. The corner squares A, E, V, Z, and the centre square N, are always known, and every other square naturally falls into place. This disposes of any objection that the letters would cover over names or detail on the map. For example, the reference to Teekree in standard sheet 5 is F.4, though there is nothing shown on the map (Plate 6).

[2] With a little practice this can be done by eye without using the talc. For instance, the reference F.6.N is quite near enough to fix Pachgaon, and F.4.y to fix Charoora (Plate 7).

NAVAL NOTES.

Home. The following are the principal appointments which have been made: Rear-Admiral—R. F. O. Foote, C.M.G., to be President of the Ordnance Board. Captains—L. Bayly, C.V.O., to "Topaze," as Commodore Second Class, in the Home Fleet, in charge of destroyers in commission with full crews; M. Browning to "King Edward VII," as Chief of the Staff to Admiral Lord Charles Beresford, G.C.V.O., K.C.B.; W. C. M. Nicholson to "Berwick"; L. Clinton-Baker to "King Alfred"; R. J. Prendergast to "Carnarvon"; J. M. de Robeck to "Dominion"; R. F. Scott, C.V.O., to "Essex"; S. H. Carden to "Lord Nelson"; the Hon. G. A. Hardinge to "Donegal." Commander—C. W. G. Crawford to "Shearwater," as Commander-in-Charge for station duties on the West Coast of North America.

Rear-Admiral the Hon. S. C. J. Colville, C.B., hoisted his flag at Chatham on the 3rd ult., on board the "Bulwark," on assuming the command of the Nore Division of the Home Fleet in succession to Rear-Admiral F. Finnis, C.V.O. Rear-Admiral J. Denison also hoisted his flag on board the "Niobe," at Devonport, on the 3rd ult., on assuming command of the Devonport Division of Home Fleet, in succession to Rear-Admiral S. F. Niblett, C.V.O., whom he also succeeds as President of the Devonport War College.

Distribution and Composition of Destroyer Flotillas.—The following changes in the composition of the various groups of flotillas of torpedo-boat destroyers have taken place:—The "Garry" and "Ribble" will turn over from the Western to the Eastern group, and the "Kennet" and "Chelmer" will be completed to full crews for service in the Western group. The "Fawn," "Recruit," "Vulture," and "Thorn," now in the Eastern group will be reduced to nucleus crews, the balance crews being transferred to the "Waveney," "Gala," "Teviot," and "Usk," respectively, the last four destroyers then joining the Eastern group. The "Flirt" and "Syren," now in the Eastern group, are to be reduced to nucleus crews, and, together with the "Peterel" from Portsmouth and the "Leven," "Blackwater," and "Ouse" from Devonport, are to proceed to Portland to form the new reserve for the Western group. These changes will not alter the respective ports to which the torpedo-boat destroyers are attached for purposes of manning, docking, &c.

Early this month four of the new ocean-going destroyers, which have recently completed their trials with marked success, will be put into commission. These are the "Cossack," "Ghurka," "Mohawk," and "Tartar,"

Home.

while a fifth, the "Afridi," is to be ready to hoist the pennant in March. The vessels are now at the contractors' yards, but when completed the "Cossack," "Mohawk," and "Tartar" will go to Devonport to fill up with stores, and then proceed to Chatham, where the full crews will be provided for them. These three boats will draw their nucleus crews from the "Havock," "Dove," and "Sunfish," respectively, the remaining ratings being supplied either from the Naval Barracks, or from the balance crews of the boats they replace. The "Ghurka" and the "Afridi" will go from the contractors' yards direct to Chatham to take in stores and complete to full crews, which will be drawn from the nucleus and balance crews of the "Haughty" and "Locust" respectively. All five vessels will be attached to the Eastern group of destroyers in the Home Fleet, and for manning and similar purposes will be under the same conditions as the other destroyers at the Nore.

The "Havock," "Sunfish," "Dove," "Haughty," and "Locust" are to be recommissioned, the three first-named with nucleus crews from the "Salmon," "Snapper," and "Hardy," the others from the nucleus crew destroyer divisions at Portsmouth and Chatham respectively. The "Salmon" and "Snapper" will be provided with nucleus crews from Devonport, and the "Hardy" from Portsmouth. When these changes have been made the "Havock," "Sunfish," "Dove," and "Locust" will be attached to the Nore Division, the "Haughty" and "Hardy" will go to Portsmouth, and the "Salmon" and "Snapper" to Devonport; all these boats being placed in their respective nucleus crew divisions of the Home Fleet.

By this arrangement five of the new vessels will be passed into the fully commissioned division of destroyers attached to the Home Fleet at the Nore, and four 30-knot boats will relieve others of less speed in the nucleus crew division at the same port, the slower boats being transferred further west.

"Tartar's" Coal-Consumption Trial.—The new 33-knot "Tribal" type destroyer "Tartar," built by Messrs. John I. Thornycroft and Co. (Limited), which maintained a speed of 35·363 knots throughout a six hours' trial, and 37·037 knots as the best single run, in December last, carried out the official 24 hours' fuel consumption trial on January 17 and 18. The trial was entirely successful. The stipulated speed of 13 knots while running economically was exceeded, the actual speed during the period being 13·105 knots, whilst the consumption of the Thornycroft boilers using oil fuel was within the limit provided for in the Admiralty contract.

Naval Gunlayers' Test, 1907.—The return showing the results of the gunlayers' tests with heavy guns in the Fleet for 1907 has been issued (Cd.3900). In a preliminary note their lordships remark with extreme satisfaction the further improvement in the results as compared with those obtained in 1906, when the shooting showed a marked advance over previous years. The return differs very slightly from that which was issued for 1906, and chiefly owing to the circumstance that the hits made on the larger target used in 1906 are given for comparison as well as those made on the 1907 "bull's-eye." The usual tabular statement showing the general improvement made in marksmanship since 1898 is given, from which we take the figures for the last four years, as these exhibit the

Home.

continuous development and progress which have taken place, although in each of these years the test has been made more severe :—

——	1904.	1905.	1906.	1907.
Number of ships that fired	108	100	89	121
Number of guns	1,171	1,096	1,073	1,365
Number of hits ... ... 1906 target	5,748	4,374	5,733	7,547
1907 "				4,073
Number of misses ... ... 1906 "	7,664	3,357	2,328	1,991
1907 "				5,465
Excess of hits over misses ... 1906 "	Nil	1,017	3,405	5,556
1907 "				Nil
Excess of misses over hits ... 1906 "	1,916	Nil	Nil	Nil
1907 "				1,392
Percentage of hits to rounds fired 1906 "	42·86	56·58	71·12	79·13
1907 "				42 70
Hits per gun per minute :—				
12-inch and 10-inch ... ... 1906 target	·47	·58	·81	·61
1907 "				·40
9·2-inch ... ... 1906 "	·73	1·40	2·84	3·25
1907 "				2·01
7·5-inch ... ... 1906 "				3·48
1907 "				1·58
6-inch Q.F. and B.L. ... ... 1906 "	2·63	4·14	5·68	5·93
1907 "				3·32
4·7-inch and 4-inch Q.F. ... 1906 "	2·28	3·73	4·96	5·73
1907 "				2·38
Number of ships from whom no returns were received	43	Nil.	Nil	3

Abstract, 1907.

Order of Merit	Fleet or Squadron.	No. of Ships.	No. of Men Firing.	Points per Man.	First Ship in Fleet.	Scores.
1	CHINA	6	74	59·783	"King Alfred" ...	74·76
2	Atlantic and Second Cruiser.	13	176	41·967	"Albion"... ...	62·35
3	Mediterranean and Third Cruiser.	14	175	42·990	"Prince of Wales"	62·98
4	Channel and First Cruiser.	16	228	34·835	"Vengeance" ...	49·58
5	Home and Fifth Cruiser.	41	468	34·206	"ACHILLES" ...	76·34
6	Australia	9	90	31·531	"Powerful" ...	50·00
7	East Indies	4	38	27·129	"Perseus" ..	34·34
8	Cape of Good Hope	3	29	24·613	"Hermes" ...	42·95
9	N.A. and W.I. and Fourth Cruiser.	3	24	22·635	"Indefatigable"...	36·32
10	Special Service, Tenders, etc.	12	63	21·830	"Skipjack" ...	38·89
	Total, 1907 Target	121	1,365	36·884		
	Total, 1906 Target	121	1,365	68·416		
	Total, 1906 Test ...	89	1,073	80·065		

NOTE.—It will be observed that the "Points per man" for 1907, on 1906 pattern target, is considerably lower than for 1906. This is due to the value per hit in 1907 being less than it was for the 1906 test. If the "Points per man" is calculated on the value per hit in 1906 test, the "Points per man" for 1907 will be 84·385.

Home. The table shows in the first line and the last the number of vessels that fired in each year and the number that did not carry out or have yet to carry out the test. Only three ships out of the sea-going fleet are in the last-named categories, and, allowing for this circumstance, there is shown to have been a slight increase in the total number of ships in commission. Comparing the number of guns fired and the number of rounds with the hits made, it is shown that whereas in 1906 1,073 guns fired 8,061 rounds, making 5,733 hits, in 1907 1,365 guns fired 9,538 rounds, making 7,547 hits, on similar targets, the excess of hits over misses rising from 3,405 to 5,556, while the percentages of hits to rounds fired rose from 71·12 to 79·13. Even on the 1907 target, of much smaller area, the excess of misses over hits was not as much as was the case with the larger target in 1904, and the percentage of hits to rounds fired is 42·70. It is manifest, therefore, that, while there has been sustained improvement on the old lines, the reduction in size of the target and the shorter time allowed for the firing have had their natural results and have brought down the average. The columns showing hits per gun per minute give the figures for both sizes of target, and must also be considered satisfactory, for, although the heaviest guns have not done quite so well this year, the shooting with the 9·2-in. has risen from 2·84 to 3·25, with the 6-in. from 5·68 to 5·93, and with the lightest guns used in the test from 4·96 to 5·73. The gunlayers have, therefore, once more raised the general average of marksmanship.

The abstract of the firing for 1907, which appears on the second page of the return, shows the China Squadron first in order of merit, with the best ship of the squadron the "King Alfred," the flag-ship of Admiral Sir Arthur Moore. The second place in the list is taken by the Atlantic Fleet and Second Cruiser Squadron, with the "Albion" as leading ship. Last year the Second Cruiser Squadron led and the Mediterranean Fleet was in the second place, now the Mediterranean Fleet and its affiliated cruiser squadron stand third in order of merit, with the "Prince of Wales" as best ship. The points per man, calculated on the value per hit in 1906 test, have risen from 80·065 to 84·385, and the scores per squadron also indicate progress.

In the table which gives the firing by the different descriptions of guns, the "Formidable," in the Mediterranean, stands first in order of merit with the 12-in. gun, the time being for one run 2¾ min. for each turret. The firing was from two turrets, and 11 hits were made out of 16 rounds. With the 10-in. gun marks VI. and VII., one run of two minutes, the "Triumph" and "Swiftsure" tied, the first-named ship making three hits out of eight rounds and the other four hits out of 11 rounds. The "Achilles," of the Fifth Cruiser Squadron, was first in order of merit with the 9·2-in. B.L. mark X., one run of two minutes, making, with six guns, 48 hits on the new target out of 57 rounds. The "Achilles" was also at the top with the 7·5-in. B.L., firing four guns and making 19 hits out of 38 rounds. With the 6-in. B.L. mark XI., one run of one minute, the "Black Prince" stands first, with 53 hits out of 74 rounds from ten guns, while with the 6-in. B.L. marks VII. and VIII. the "King Alfred" made 96 hits out of 176 rounds with 16 guns. The "Astræa," on the same station, is first in order of merit with the 6-in. Q.F., one run of one minute, 11 hits out of 15 rounds with two guns, and she also stands first with the 4·7-in. Q.F., one run of one minute, making with eight guns 36 hits out of 79 rounds fired. With the lightest gun used in this test, the 4-in. Q.F., one run of three-quarters of a minute, the

Home. "Perseus," of the East Indies Squadron, stands first, having made 21 hits out of 59 rounds fired with eight guns.

The ships of the Home Fleet with nucleus crews having a smaller amount of ammunition to fire are placed in a separate category, as their time allowance is less than that for the fully commissioned ships. The "Prince George" leads with the 12-in., six hits out of 10 rounds, and also with the 6-in. Q.F., 51 hits out of 79 rounds. The "Cornwall" is first in order of merit with the 6-in. B.L. marks VII. and VIII., 35 hits out of 85 rounds. The "Circe" is first with the 4·7-in. Q.F., making five hits out of 11 rounds.

The concluding table in the return gives the Fleet classified in order of merit of ships competing. The first three ships are the "Achilles," "King Alfred," and "Prince of Wales," the best shots being J. German (sergeant R.M.A.) and J. Smith (A.B.) for the first named vessel, H. Carter (leading seaman) and S. Dawson (leading seaman) for the second, with W. Kent (petty officer) and F. Ford (leading seaman) for the third. The highest number of points allotted to any ship was 76·34, and there were 32 ships out of the 121 firing that obtained less than 25 points.—*Times* and *Admiralty Gunnery Return.*

General.

The war-ships, exclusive of torpedo-boats and submarines, launched during the year 1907, with their tonnage, I.H.P., and estimated speed, were as follows:—

Great Britain. — First-Class battle-ships: "Bellerophon," "Téméraire," "Superb," all of 18,600 tons, 23,000 I.H.P., and 20·5 knots speed. First-class armoured cruisers—"Invincible," "Inflexible," "Indomitable," all of 17,250 tons, 41,000 I.H.P., and 25 knots speed; "Defence," 14,600 tons, 27,000 I.H.P., and 23 knots speed. Torpedo-boat Destroyers — "Afridi," "Cossack," "Ghurka," "Mohawk," "Tartar," all of 795 tons, 14,250 I.H.P., and 33 knots speed.

France. — First-class battle-ship: "Vérité," 14,865 tons, 18,000 I.H.P., and 18 knots speed. First-class armoured cruiser—"Edgard Quinet," 14,000 tons, 37,000 I.H.P., and 23 knots speed. Torpedo-boat destroyers—"Sape," "Branlebas," "Fanfare," "Gabion," "Carquois," "Trident," "Pierrier," of 450 tons, 6,800 I.H.P., and 26 knots speed.

Germany — Third-class cruisers: "Dresden," "Stettin," of 3,450 tons, 13,500 I.H.P., and 24 knots speed. Torpedo-boat destroyers—12 (two Half-Flotillas), 525 tons, 10,000 I.H.P., and 29·5 knots speed.

Italy.—First-class battle-ship: "Roma," 12,625 tons, 20,000 I.H.P., and 22 knots speed. First-class armoured cruiser—"Pisa," 9,830 tons, 23,000 I.H.P., and 22·5 knots speed.

Japan.—First-class battle-ship—"Aki," 19,800 tons, 27,000 I.H.P., and 22 knots speed. First-class armoured cruisers—"Ibuki," "Kurama," both of 14,620 tons, 25,000 I.H.P., and 22·5 knots. Second-class cruiser—"Tone," 4,100 tons, 15,000 I.H.P., and 23 knots speed. Third-class cruisers—"Yodo," 1,250 tons, 6,500 I.H.P., and 22 knots speed; "Mogami," 1,350 tons, 8,000 I.H.P., and 23 knots speed. Destroyers.—Number uncertain.

Home.

Russia.—First-class battle-ship: "Imperator Pawel I.," 17,400 tons, 17,600-I.H.P., and 18 knots speed. First-class armoured cruiser—"Bayan," 7,887 tons, 16,500-I.H.P., and 21 knots speed. Torpedo-boat destroyers—"Kapitan Baranov," "Lieutenant Schestakov," "Kapitan Saaken," "Lieutenant Sazarenny," 614 tons, 6,500 I.H.P., and 25 knots speed.

United States.—Scout cruisers: "Salem," "Chester," "Birmingham," 3,750 tons, 16,000 I.H.P., and 24 knots speed.

France.

The following are the principal promotions and appointments which have been made:—Vice-Admiral A. E. H. Boué de Lapeyrère to be Commander-in-Chief of the *2e Arrondissement Maritime* (Brest). Rear-Admirals.—A. E. H. Boué de Lapeyrère, J. Bellue, to be Vice-Admirals. Capitaines de Vaisseau—P. G. Forestier, J. M. Nény, to be Rear-Admirals; A. M. Ytier to "Desaix"; P. M. Vincent, to "Kléber." Capitaines de Frégate—L. M. Ytier, J. E. Caron, C. V. Ollivier, J. S. Kéraudren, to be Capitaines de Vaisseau; J. A. Florius to "Gironde"; P. V. Receveur to Command of First Submarine Flotilla in Channel; M. G. Grout to "Friant"; F. A. Boyer to "Cassard"; N. Marius to "Vinh-Long"; J. E. Ratyé to "Isly."—*Journal Officiel de la République Française.*

General.—Vice-Admiral Boué de Lapeyrère, who has just been promoted to his present rank, is only fifty-six years of age, and is one of the lucky officers of the French Navy, for he is not only much the youngest officer of his rank, but is also one of the youngest on the Flag List as well. He became a Rear-Admiral in August, 1902, and has commanded the Atlantic Naval Division. Vice-Admiral Bellue, who received his promotion the same day, is four years older, and as a Rear-Admiral was Commander-in-Chief of the Tunis Naval Division. Both the two newly-appointed Rear-Admirals, Forestier and Nény, are two years older than Vice-Admiral Boué de Lapeyrère, while the senior of the newly-promoted Captains is only a year younger.

M. Thomson completed three years as Minister of Marine on January 26. It is the first time since 1870 that any Minister of Marine has remained so long in office.

The second-class cruiser "Cassard" has been commissioned at Toulon, and is to relieve one of the cruisers stationed off the coast of Morocco, more than one of which are reported to stand in need of repairs, especially to their machinery.

Wireless telegraphic communication has been established between the "Kléber" at Casa Blanca and the Eiffel Tower, Paris. These wireless messages are also being taken in at Brest (Parc-au-Duc station), which is especially interesting, as the Parc-au-Duc station, so far from disposing of a support 300 metres (993 feet) high, has only a mast of 50 metres (165 feet) altitude. Communication by wireless with Casa Blanca is now being carried on uninterruptedly.

The new first-class battle-ship "Danton" is being constructed on the slip of the "Point du Jour," at Brest.

Experiments are being conducted by a committee with torpedo-boat N. 171 to arrive at means of running torpedoes on or near the surface, so that a torpedo-boat when chased by a destroyer may be able to defend herself by using her torpedoes with effect.

France. Submersible "Q 64" was launched at Rochefort on January 4th. She is one of the "Laubeuf" type, has a displacement of 398 tons, is 51·12m. (168 feet) long, and 4·97-m. (16 feet) beam, has a surface speed of 12 knots, and submerged speed of 8 knots. She carries seven torpedo discharges, and her complement is fixed at two officers and 22 men.

The Squadron of the North. — This Squadron has now been reconstituted as follows :—

First Division.

First-class Armoured Cruisers—"Léon Gambetta" (flag-ship of Vice-Admiral Jauréguiberry, Commander-in-Chief), "Amiral-Aube," "Dupetit-Thouars," with the third-class cruiser "Forbin" as repeating ship.

Second Division.

First-class Armoured Cruisers.—"Marseillaise" (flag-ship of Rear-Admiral Thierry), "Amiral-Gueydon," "Jeanne d'Arc," with the torpedo-aviso "Cassini" as repeating ship.

Third Division.

Second-class Armoured Cruisers. — "Desaix" (flag-ship of Rear-Admiral Philibert), "Kléber."
Second-class Cruisers—"Chasseloup-Laubat," "Isly."
Third-class Cruisers—"D'Estrées," "Surcouf."
Destroyer Flotilla. — "Bombarde," "Batiste," "Catapulte," "Obusier," "Arquebuse," "Bélier."

The first-class armoured cruiser "Marseillaise" was commissioned at Brest on the 1st ult., as flagship of Rear-Admiral Thierry, Commanding the Second Division of the Squadron of the North; the officers and crew of the "Gloire" being transferred to her, the "Gloire" has been placed in normal reserve at Brest for repairs.

The Suppression of the Atlantic Naval Division. — It is now stated that the suppression of the Atlantic Naval Division is not to be a temporary measure, but that the Division, as an independent unit, is to be abolished, and the ships formerly composing it will be incorporated in the Squadron of the North.

It is pointed out that the existence of this squadron has for some years past been an anomaly, and that both from the numerical and fighting point of view it has long ceased to be efficient. Whenever difficulties have arisen in Morocco, which has been in its sphere of action, it has been found necessary to draw upon the Mediterranean and Northern Squadrons for ships. When, some two years ago, action against Venezuela was contemplated, the Atlantic Division would not have been strong enough to have undertaken the work. When France had to be represented a year ago in the United States at the Paul Jones Commemoration, it was necessary to send a Cruiser Division specially out from home for the purpose.

For the future, the ships of the division will form a light division for the Squadron of the North, now only composed of heavy armoured cruisers, which is much wanted. There may be some regret felt that the country will no longer have a permanent squadron in the Atlantic, but there is no real ground for regret, since, as a matter of fact, the present Squadron of the North, composed, as it now is, of powerful cruisers, is

France.

really the Atlantic Squadron, which the old squadron, composed in the main of weak coast-defence ships, never was or possibly could be. The hope, however, is expressed that the Minister of Marine will not allow the new squadron to remain tied to the Channel, but that it will be sent to cruise regularly in the Atlantic, showing the flag, not only in the Antilles, but along the coasts of South America, besides periodically exercising in the North Sea and visiting the Baltic.

Steam Trial. — The new first-class battle-ship "Vérité" has completed, at Brest, a very satisfactory full-speed trial of ten hours. During the trial the engines developed 20,433 I.H.P., or 2,433 H.P. over the contract, giving a speed of 19·2 knots, or 1·2 knots over the contract, the coal consumption being 817 gr. (1 lb. 12 oz.) per indicated horse-power per hour. Her boilers are the Belleville. At the 24 hours' coal-consumption trial at 10,500 I.H.P., the actual H.P. developed was 11,814 during the first six hours, with a coal consumption of 610 gr. (1 lb. 5 oz.) per horse-power per hour; the mean indicated horse-power for the whole 24 hours was 11,272, with a coal consumption of 692 gr. (1 lb. 8 oz.); the contract provided for a consumption of 700 gr. (1 lb. 8 oz.) per horse-power per hour during the first six hours, and of 750 gr. (1 lb. 10 oz.) for the remainder of the run, so the actual results are considered highly satisfactory.

The Court-Martial on the Loss of the "Chanzy."—The court-martial assembled for the trial of Capitaine de Frégate Mauger for the loss of the cruiser "Chanzy" on 20th May, 1906, in the China Sea, met at Toulon on 16th January. The *Rapport*, or, as we should say, "Circumstantial Letter," gave the following account of the misfortune:—

The "Chanzy" was on passage from Saigon to Shanghai, the navigation of which is difficult, the course being obstructed by numerous groups of islands. On the evening of 19th May, 1906, when she was in Byas Bay, thick fog having been experienced for the previous two days, Lieutenant Belissent, who was on watch at 7.30 p.m., the fog lifting for a moment, got a glimpse of Shao light on the Hieshan Islands, of which he obtained a bearing which placed the ship seven miles further on than was supposed. He reported this to Captain Mauger. The position was later on confirmed by Pole Star latitude observations, taken by Ensign Puech and Aspirant Bollain, but all along Captain Mauger declined to believe in the exactitude of these observations, which showed a current running towards the north, while he persisted in believing that the current should be a southerly one. If he had listened to these two young officers, says the *Rapport*, the "Chanzy" would not have been lost.

On 20th she was off the group known as the Fisherman Islands, when a thick fog came on obscuring everything. About 4 a.m. Lieutenant Belissent, being in the chart-house, where he was relieving Ensign Cazalis and Aspirant Latty, who was on the fore-bridge, thought he saw a boat ahead, and called out at once to reverse the engines and go full speed astern. What he thought was a boat was, however, the backwater of the breakers on the islands, and it was already too late to save the ship, for though her way was considerably diminished, she struck the rocks heavily, her stem being twisted more than one metre out of line, the keel plates torn for a considerable distance, and several compartments at once filled, bulkheads being displaced by the shock.

The *Rapport* goes on to state that for nine days all worked hard, and everything that could be done to save the ship was tried, with the help of the "Protector," "Alger," "Bruix," and "D'Entrecasteaux," but without

France. success, and on May 29th, at twenty minutes past midnight, the "Chanzy" foundered.

Commandant Mauger, in his defence, stated that the French charts of these waters were old and imperfect, and explained how, having come to the conclusion that the bearing reported to him was incorrect, he did not afterwards attach any importance to the two Pole Star observations.

The President of the Court asked why he did not take more notice of the currents which flow in the Formosa Channel, and why he chose the westward instead of the eastward passage.

Captain Mauger replied that he took the western passage because it is the one followed by all merchant vessels. Rear-Admiral Boisse had appointed him to the naval command of the Upper Yang-tse, and he thought it his duty to proceed there as quickly as possible, and he preferred losing three hours to four days.

"Yes," continued the President, "but it would have been better to lose four days than to lose your ship. Why did you not anchor in the fog before imprudently steering into the Chusan Archipelago?"

"I thought it would be dangerous, being so much in the track of merchant steamers."

"There would be less danger from that than of running on the rocks," replied the President.

After six hours' trial, the court found the prisoner guilty of negligently hazarding and losing his ship, by a majority of five votes to two, and he was sentenced to be deprived of all command for three years and to pay the costs of the trial.—*Le Temps, Le Moniteur de la Flotte, Le Yacht* and *La Vie Maritime.*

Germany. *Submarines.*—The construction of submarine boats has recently been taken up by German shipbuilders, and after a series of trials on a small model boat, the Germania shipyard at Kiel have just completed a large submarine of 240 tons. The main dimensions of this vessel are:—Length over all, 137·5 feet; maximum width across frames, 11·7 feet; draught of boat when emerged, 7·8 feet. An electric motor and gas engine, each with an output of 200-I.H.P., are fitted to each of the two propeller shafts, the propeller being adjusted from the inside of the vessel. The electric motors are designed for propulsion below water, and receive current from an accumulator battery installed amidships. The battery is sufficient to drive the boat below water for fully three hours at its maximum speed of 9 knots. When on the surface, the gas engines are preferably to be used. The fuel is carried in tanks, arranged outside of the boat (according to patents of the Germania shipyards) thus guarding against explosion. The store carried by the submarine enables the latter to cover a distance of 1,000 knots at her maximum speed of 11 knots on the surface.

The motors can obviously be used also for propulsion above water, while both types of motor can also be used simultaneously for the propulsion of the vessel.

The submersion and emersion of the boat is effected by filling and discharging the ballast tanks arranged inside, as well as by the aid of two pairs of horizontal rudders. The maximum admissible depth of submersion has been fixed at about 120 feet. Only five minutes are required to prepare for submerging the boat.

Germany. Special care has been bestowed on ventilation, which is secured by an electrically operated ventilator, which, as long as the boat is above water, will constantly supply all the rooms with fresh air. When submerged, the vitiated air is passed through a cleaning tank, after which it returns towards the various compartments of the boat. With a crew of 10 men, the vessel is able to move under water for periods up to 24 hours.

The armoured conning-tower arranged in the centre of the boat and enclosing all necessary instruments, such as viewing apparatus, manometers, rudders, and telephones, is large enough readily to accommodate the commander and the pilot. Two periscopes have been provided, which, both in a vertical and horizontal direction, cover a field of 50 degrees. The length of these inclosing telescopic tubes has been chosen with a view to allow the boat to travel at a depth sufficient to warrant it against gun fire, while still enabling it to cover the whole of the horizon.

The armament of the submarine comprises an 18-inch bow torpedo-launching tube. One of the three large-sized torpedoes carried by the vessel is contained in the tube, while the two remaining ones are arranged in water-tight reservoirs.

Trial runs performed in Eckernförde Bay, both in the emerged and submerged condition, have demonstrated the satisfactory sea-going qualities of the submarine.—*Scientific American.*

The Estimates for 1908.—The Estimates for 1908 amount to 339,323,724 marks (£16,966,186 4s.), as against 278,473,005 marks (£13,923,650 5s.) voted for 1907, showing an increase of 60,850,719 marks (£3,042,535 19s.). The following are the principal items :—

ORDINARY PERMANENT ESTIMATES.

	Proposed for 1908.			Voted, 1907.	
	Marks.	£	s.	£	s.
Imperial Ministry of Marine and Naval Cabinet	2,034,395	= (101,719	15)	94,927	0
Naval Headquarter Staff	314,150	(15,707	10)	15,466	15
Observatories, etc.	377,864	(18,893	4)	18,326	14
Station Accounts Department	684,570	(34,228	10)	30,897	18
Legal Department	182,660	(9,133	0)	8,516	0
Chaplains' Department and Garrison Schools	166,393	(8,319	13)	6,990	15
Pay of Officers and Men	31,323,195	(1,566,159	15)	1,451,533	15
Maintenance of Fleet in Commission	36,427,000	(1,821,350	0)	1,559,858	0
Allowances for Officers and Men	2,312,334	(115,616	14)	108,818	14
Clothing	436,519	(21,825	19)	22,014	3
Barrack and Garrison Administration, etc. ...	1,143,009	(57,150	9)	48,119	10
Barrack and Garrison Construction	730,909	(36,545	9)	33,466	14
Lodging Allowance	2,716,694	(135,834	14)	127,852	17
Medical Department	2,490,348	(124,517	8)	115,886	18
Travelling, Transport, and Freight Charges ...	3,147,780	(157,389	0)	170,550	0
Training Establishments	490,958	(24,547	18)	24,627	17
Maintenance of Fleet and Dockyards ...	32,533,167	(1,626,658	7)	1,479,926	16
Ordnance, Arms, and Fortification	12,821,028	(641,051	8)	559,720	18
Accountant-General's Department	972,190	(48,609	10)	46,033	7
Pilotage and Surveying	756,195	(37,809	15)	36,715	8
Miscellaneous Expenses	1,624,341	(81,217	1)	18,069	1
Administration of Kiau-Chau Protectorate ...	115,375	(5,768	15)	5,195	15
Total	133,801,074	(6,690,053	14)	6,043,564	15

Special Ordinary Estimates.

Shipbuilding Programme for 1908.

For the construction of the following ships :—

	Marks.	£	s.
The first-class battle-ship "Schleswig-Holstein (Q)," 4th and final Vote	2,350,000	= (117,500	0)
" " " "Schlesien (*R*)." 4th and final Vote	2,350,000	(117,500	0)
The first-class armoured cruiser "Scharnhorst," 4th and final Vote	1,500,000	(75,000	0)
The first-class battle-ship Ersatz "Bayern," 3rd Vote ...	5,800,000	(290,000	0)
" " " Ersatz "Sachsen," 3rd Vote ...	5,800,000	(290,000	0)
The first-class armoured cruiser "E," 3rd Vote	5,000,000	(250,000	0)
The third-class cruiser Ersatz "Pfeil," 3rd and final Vote ...	1,090,000	(54,500	0)
" " " "Dresden," 3rd and final Vote ...	1,090,000	(54,500	0)
Battle-ship Ersatz "Wurttemberg," 2nd Vote	8,600,000	(430,000	0)
" Ersatz "Baden," 2nd Vote	8,600,000	(430,000	0)
First-class cruiser "F," 2nd Vote	9,000,000	(450,000	0)
Third-class cruiser Ersatz "Greif," 2nd Vote	3,000,000	(150,000	0)
" " Ersatz "Jagd," 2nd Vote	3,000,000	(150,000	0)
Fitting up battle-ship "König Wilhelm" as a Volunteer Drill ship, 2nd and final Vote	200,000	(10,000	0)
Repairs and alterations to first-class battle-ship "Hansa," 2nd and final Vote	950,000	(47,500	0)
Tender Ersatz "Ulan," 2nd and final Vote	600,000	(30,000	0)
First-class battle-ship Ersatz "Oldenburg," 1st Vote ...	5,500,000	(275,000	0)
" " Ersatz "Siegfried," 1st Vote	5,500,000	(275,000	0)
" " Ersatz "Beowulf," 1st Vote	5,500,000	(275,000	0)
" cruiser "G," 1st Vote	5,000,000	(250,000	0)
Third-class " Ersatz "Schwalbe," 1st Vote	2,500,000	(125,000	0)
" " Ersatz "Sperber," 1st Vote	2,500,000	(125,000	0)
River-Gunboat C, 1st Vote	500,000	(25,000	0)
Repairs and alterations to first-class battleship, Kaiser Class, 1st Vote ...	2,000,000	(100,000	0)
" " " cruiser "Frederick Carl," 1st Vote...	1,000,000	(50,000	0)
" " another third-class cruiser	1,000,000	(50,000	0)
Flotilla of Torpedo Boats, 2nd and final Vote	7,000,000	(350,000	0)
" " " 1st Vote	10,000,000	(500,000	0)
Repairs to Torpedo Boats	400,000	(20,000	0)
Construction of and experiments with Submarines... ...	7,000,000	(350,000	0)
Total	114,330,000	(5,716,500	0)
For the Gun and Torpedo Armaments of New Ships, and Mines	56,680,000	(2,834,000	0)
Miscellaneous Expenditure: Dockyards, etc.	8,787,500	(439,375	0)
	179,797,500	(8,989,875	0)
From which has to be deducted, credited in the Extraordinary Estimates	64,410,000	(3,220,500	0)
Leaving Total	115,387,500	(5,769,375	0)

Summary.

	1908. Marks.	£	s.	1907. £	s.	Increase, 1908. £	s.
Ordinary Permanent Estimates	133,801,074	= (6,690,053	14)	6,043,564	15	(646,488	19)
Shipbuilding, Armament, etc.	115,387,500	(5,769,375	0)	5,011,572	10	(757,802	10)
Extraordinary Expenditure ...	90,135,150	(4,506,757	10)	2,868,513	0	(1,638,244	10)
Total	339,323,724	(16,966,186	4)	13,923,650	5	(3,042,535	19)

—Etat für die verwaltung der Kaiserlichen Marine auf das Rechnungsjahr, 1908.

United States.

President's Plea for Army and Navy.—In his annual message President Roosevelt devotes considerable space to the discussion of the affairs of the Army and Navy. Concerning the Navy he says, while referring to the failure of the Hague Conference to take any action on the subject of disarmament:—

"It is evident that it is folly for this nation to base any hope of securing peace on any international agreement as to the limitation of armaments. Such being the fact, it would be most unwise for us to stop the upbuilding of our Navy. To build one battleship of the best and most advanced type a year would barely keep our fleet up to its present force. This is not enough. In my judgment we should this year provide for four battleships. But it is idle to build battleships unless in addition to providing the men and the means for thorough training we provide the auxiliaries for them, unless we provide docks, the coaling stations, the colliers and supply ships that they need. We are extremely deficient in coaling stations and docks on the Pacific, and this deficiency should not longer be permitted to exist. Plenty of torpedo-boats and destroyers should be built. Both on the Atlantic and Pacific coasts fortifications of the best type should be provided for all our greatest harbours.

"We need always to remember that in war, for defence against a hostile fleet which actually attacks them, the coast cities must depend upon their forts, mines, torpedoes, submarines asd torpedo-boats and destroyers. The ships must be kept together and their objective made the enemies' fleet. If fortifications are sufficiently strong no modern navy will venture to attack them so long as the foe has in existence a hostile navy of anything like the same size or efficiency. But unless there exists such a navy the fortifications are powerless by themselves to secure the victory.

"Until our battle fleet is much larger than at present it should never be split into detachments so far apart that they could not in event of emergency be speedily united. Our coast line is on the Pacific just as much as on the Atlantic. The battle fleet should now and then be moved to the Pacific, just as at other times it should be kept in the Atlantic. When the Isthmian Canal is built the transit of the battle fleet from one ocean to the other will be comparatively easy. Until it is built I earnestly hope that the battle fleet will be thus shifted between the two oceans every year or two.

"The marksmanship on all our ships has improved phenomenally during the last five years. Until within the last two or three years it was not possible to train a battle fleet in squadron manœuvres under service conditions, and it is only during these last two or three years that the training under these conditions has become really effective. Another and most necessary stride in advance is now being taken. The battle fleet is about starting by the Straits of Magellan to visit the Pacific coast. This trip to the Pacific will show what some of our needs are and will enable us to provide for them. The proper place for an officer to learn his duty is at sea, and the only way in which a navy can ever be made efficient is by practice at sea, under all the conditions which would have to be met if war existed.

"I bespeak the most liberal treatment for the officers and enlisted men of the Navy. It is true of them, as likewise of the officers and enlisted men of the Army, that they form a body whose interests should be close to the heart of every good American. In return the most rigid performance of duty should be exacted from them. The reward should be ample when they do their best, and nothing less than their best should be tolerated. It is idle to hope for the best results when the men in the senior grades come

United States

to those grades late in life and serve too short a time in them. Up to the rank of lieutenant commander promotion in the Navy should be as now, by seniority, subject, however, to such rigid tests as would eliminate the unfit. After the grade of lieutenant commander, that is, when we come to the grade of command rank, the unfit should be eliminated in such manner that only the conspicuously fit would remain, and sea service should be a principal test of fitness. Those who are passed by should, after a certain length of service in their respective grades, be retired. Of a given number of men it may well be that almost all would make good lieutenants and most of them good lieutenant commanders, while only a minority will be fit to be captains, and but three or four to be admirals. Those who object to promotion otherwise than by mere seniority should reflect upon the elementary fact that no business in private life could be successfully managed if those who enter at the lowest rungs of the ladder should each in turn, if he lived, become the head of the firm, its active director, and retire after he had held the position a few months. On its face such a scheme is an absurdity. Chances for improper favouritism can be minimized by a properly formed board; such as the board of last June, which did such conscientious and excellent work in elimination.

"Upon this subject the Secretary of the Navy has submitted details and definite recommendations, which have received my approval, and which if enacted in law will accomplish what is immediately necessary, and will, as compared with existing law, make a saving of more than five millions of dollars during the next seven years. The Navy Personnel Act of 1899 has accomplished all that was expected of it in providing satisfactory periods of service in the several subordinate grades, from the grade of ensign to the grade of lieutenant commander, but the law is inadequate in the upper grades and will continue to be inadequate on account of the expansion of the *personnel* since its enactment.

"As stated in my special message to the last Congress: "I am firmly of the opinion that unless the present condition of the higher commissioned *personnel* is rectified by judicious legislation the future of our Navy will be gravely compromised." It is also urgently necessary to increase the efficiency of the Medical Corps of the Navy. Special legislation to this end has already been proposed, and I trust it may be enacted without delay. The United States Navy is the best guarantee the nation has that its honour and interest will not be neglected; and in addition it offers by far the best insurance for peace that can by human ingenuity be devised."

The President calls attention to the report of the last board of visitors to the Naval Academy on the subject of the course of study there, and states that the results of the changes made in the recommendation of the Wainright board appointed to consider the matter will be, he is confident, "most beneficial to the Academy, to the midshipmen and to the Navy."

Contracts for Battle-ships and Armour Awarded.—The Secretary of the Navy has awarded the contracts for the two battle-ships of the so-called "Dreadnought" class to the Newport News Shipbuilding and Dry Dock Company and the Fore River Shipbuilding Company respectively. The proposals of the former company would have enabled the Government to build both vessels at much lower cost than will now be possible, but the law forbade the allotment of more than one ship to a single contractor.

In accepting the bid of the Newport News Shipbuilding and Dry Dock Company, the Department gives the contractor the alternative of building a vessel on the company's plans, involving the use of the Parsons

United States.

turbine for motive power, with certain slight modifications suggested by the experts of the Bureau of Construction and Steam Engineering, or upon the original plans of the department, which include reciprocating engines. If the former proposition is accepted, the contractors will receive 4,090,000 dollars; otherwise they will be paid 3,987,000 dollars.

The bid of the Fore River Shipbuilding Company accepted by the Department is based on the use of the Curtis type of turbine, the contract price being 4,377,000 dollars. It will thus be seen that if the Newport News Shipbuilding and Dry Dock Company elects to build on its own plans, which is regarded as highly probable, both big battle-ships will be equipped with turbine engines, which will mark a most important innovation in the American Navy, no other ships of this type having been designed for turbine motors.

The Secretary of the Navy has had little difficulty in disposing of the bids submitted by the naval constructors of the Brooklyn and Mare Island Navy Yards for the construction of the two big vessels. The lowest of these bids, it is now learned, was approximately 700,000 dollars higher than the minimum bid of the Newport News Shipbuilding and Dry Dock Company, and more than 300,000 dollars higher than the bid of the Fore River Shipbuilding Company, upon which the contract to that company has been awarded.

After an important readjustment of the bid of the Midvale Steel Co., the contracts for the armour for the two battle-ships have been awarded as follows:—Bethlehem Steel Co., 3,602 tons; Carnegie Steel Co., 3,543 tons; Midvale Steel Co., 2,230 tons. These awards are made on the basis of 420 dollars per ton for Class A armour (7,956 tons) and 400 dollars per ton for Class B (952 tons), Class C (392 tons), and Class D (76 tons). In submitting its bid the Midvale Steel Co. reclassified the armour according to the mechanical difficulties to be encountered in its manufacture and quoted prices on the basis of a series of five groups. The Secretary of the Navy did not regard this as a satisfactory basis for comparisons, and he therefore advised the Midvale Co. that its bid could not be considered unless submitted in accordance with the department's schedule. The proposal based on groups was then withdrawn and the Midvale Company offered to make armour at the same prices as those quoted by its competitors, whereupon a contract was awarded as above indicated.

Oil as Fuel for War-ships.—The Bureau of Equipment, Navy Department, has decided, in order to determine the relative efficiency of oil and coal as fuel for war-ships, to equip the monitor "Wyoming" with apparatus which will permit the burning of oil. For some time the Department has had in mind thorough experiments with oil as fuel, and preliminary investigations along this line have given the officials reason to believe that a thorough test will prove oil a far more satisfactory fuel, from many points of view, than coal. At any rate, they believe it will show an improvement over the soft coal that is generally used on war-ships. After making preliminary cruises out from Mare Island, the "Wyoming" will set out for a long-distance test, Hawaii being the objective point. The oil-burning apparatus will be arranged so that it may be removed and coal used in the regular way, in order that a direct comparison of the two fuels may be made on the same ship under the same weather conditions.

United States. *Steam Trial.*—The battle-ship "Mississippi" returned to Cramps' shipyard at Philadelphia 19th October, after a successful trial trip off the Delaware Capes. The war-ship was subjected to a four-hour test at full speed, followed by an endurance run of twenty-four hours. The trial was conducted by the United States Board of Inspection and Survey, Captain Richardson Clover, president. The official figures are as follows :—Average speed, four hours' full power, 17·11 knots, and for twenty-four hours' endurance trial, 15·13 knots, about 7,000-H.P. Maine engines.

MILITARY NOTES.

Home. The following are the principal appointments which have been made:—

Field-Marshal H.R.H. A. W. P. A. Duke of Connaught and Strathearn, K.G., K.T., K.P, G.C.B., G.C.S.I., G.C.M.G., G.C.I.E., G.C.V.O., Personal A.D.C. to the King, to be Field-Marshal Commanding-in-Chief the Mediterranean.

Lieut.-General.—W. H. Mackinnon, C.V.O., C.B., from Director of Auxiliary Forces, to be Director General of the Territorial Force.

Major-Generals—Sir J. G. Maxwell, K.C.B., C.V.O., C.M.G., D.S.O., to be a Major-General, General Staff. A. G. F. Browne, C.B., D.S.O., I.A., to be a Divisional Commander. Henry B. B. Watkis, I.A., to be a Brigade Commander. C. H. Des Vœux, C.B., I.A., to be a Divisional Commander, R. A. P. Clements, C.B., D.S.O., to be a Divisional Commander. C. G. M. Fasken, C.B., I.A., to be a Brigade Commander.

Colonels.—L. J. E. Bradshaw, C.B., a Brigade Commander in India, to be Major-General. C. G. M. Fasken, C.B., a Brigade Commander in India, to be Major-General. M. F. Rimington, C.B., to be a Brigade Commander, and is granted the temporary rank of Brigadier-General while so employed. E. C. W. Mackenzie-Kennedy, I.A., to be a Brigade Commander, and is granted the temporary rank of Brigadier-General while so employed. J. W. G. Tulloch, C.B., I.A., to be a D.A.G., and is granted the temporary rank of Brigadier-General while so employed. G. J. Shaw, I.A., to be an A.A.G. C. V. F. Townshend, C.B., D.S.O., the King's (Shropshire Light Infantry), to be an A.A.G. F. Waldron, C.B., from an A.Q.M.G., to be a Brigadier-General to command the Artillery of a division, and is granted the temporary rank of Brigadier-General whilst so employed. E. S. May, C.B., C.M.G., from a General Staff Officer, first grade, at Head-quarters, to be an A.Q.M.G. W. Moore-Lane, Ordnance Officer, 2nd Class, from Inspector, to be Chief Inspector A.O.D. J. P. Du Cane to be a General Staff Officer, 1st Grade, at Head-quarters. J. L. Keir, to be a Brigade Commander. J. C. Young, to be a Brigade Commander. J. T. Evatt, D.S.O., I.A., to be a Brigade Commander. C. Ross, D.S.O., h.p., to be a D.A.A.G., Staff College.

Officers' Confidential Reports.—The following has been received from the Assistant Military Secretary, Southern Command :—

1. After a study, during the past three months, of many hundreds of Confidential Reports, the General Commanding-in-Chief feels that he may be able to assist Officers Commanding units by clearly setting forth

Home.

for their guidance his own views as to the right and the wrong ways of dealing in these Reports with the incapacity of a subordinate. Such a duty is, under any circumstances, admittedly most painful. The combination of moral courage and public spirit required to give the few strokes of a pen whereby the career of a comrade may be ruined is not vouchsafed to everyone. All the more essential is it then that the difficulty should not be accentuated by any hesitation to grapple with it in its earlier stages. As a matter of fact, however, such hesitation is by no means uncommon. Where a blind eye has not been turned towards shortcomings, they have too often been glossed over by a skilful use of ambiguous phrases. Thus it goes on for a time until, at last, the inefficiency becomes so notorious that the Commanding Officer, obeying the natural instinct of self-preservation, is obliged to execute a complete volte face, and to set down in unmistakeable terms the whole unvarnished truth.

The General Officer Commanding recognises that one reason, besides natural kindness of heart, which inclines some Commanding Officers towards undue leniency is that in their minds there is an anxiety lest stricture passed upon a subordinate should lead to correspondence, friction and that worst sort of trouble which originates in the imputation of unworthy personal motives. So long, however, as his Reports have shown consistency, and so long as serious shortcomings have been reprimanded openly in Orderly Room immediately on their occurrence, the Commanding Officer has nothing to fear from such an ordeal. The danger comes when, in the hope of something turning up, the Commanding Officer has one year passed over faults without comment, and the next, perhaps, in his growing anxiety to get rid of the incapable Officer, has gone the length of advocating his translation to some extra-regimental appointment. If on the top of all this, he is eventually compelled by the glaring circumstances of the case to report badly on such an Officer, then, obviously, the inconsistency of the procedure may easily become a weapon for the destruction of the reputation of the Commanding Officer himself. Had, however, the question been boldly tackled from the outset by the entry in the Confidential Report of a frank opinion which was duly communicated to the Officer concerned, then, either that Officer would have amended his ways or else there would have been a continuous accumulation of evidence as to his incapacity.

The idea sometimes prevails that it is cruel to write anything which might result in some sort of a black mark being recorded against a very young Officer. The precise contrary is the case, for the real cruelty consists in encouraging some individual who may possess potentialities of success in another walk of life, to fix himself in a profession for which he has no natural aptitude. Half the public school boys who elect for the Army are still too immature to have formed any clear-cut notion as to their true vocation in life. They see a fairly easy fence close before them in the shape of the entry examination for Sandhurst and they follow one another over it like a flock of sheep. It would be passing strange if a proportion at least of these young men did not fall short in some way or another of the high obligations of the military profession. It is a kindness, therefore, whilst there is yet time, to remove the round peg from the square hole where, evidently, something must be damaged and strained before its circumference can come into easy juxtaposition with the angles of its setting. The General Commanding-in-Chief desires, therefore, to impress upon all Commanding Officers the importance of complying strictly

Home. with the instructions contained in Paragraph 212, King's Regulations. Most of them will be able, without much trouble, to call to mind cases where their predecessors refrained from using the powers conferred upon them in this paragraph from a mistaken sense of benevolence. They will recall these cases because the time is approaching when they will have to reap what those predecessors had so lightly allowed to take firm root. The results are now at their side making their task infinitely more difficult, and inflicting a great hardship on Officers concerned who have probably, by this time, reached an age when they find it extremely difficult to make a fresh start in life. Let Commanding Officers see to it then that their successors cannot hereafter tax them with similar weakness, and let them remember that openness and promptitude are from all points of view their best weapons for dealing with this the most invidious and distasteful of their duties.

2. It might seem hardly necessary, after what has just been written, to warn Commanding Officers of units against the danger of taking too much upon themselves, seeing that the general tendency is certainly all the other way. Occasionally however, persons in authority, who are more than sufficiently cautious when they are required to put their signature to a deliberate opinion, seem ready enough to leave their discretion behind them during a personal interview. No doubt a broad distinction may be drawn between the written and the spoken word, but still, Sir Ian Hamilton has no hesitation in proffering his strong advice to Commanding Officers against saying anything to a subordinate regarding his future prospects which might be held to savour of pressure. An entry in the Confidential Report duly communicated to the Officer concerned or a letter to Head-quarters anticipating such a report are the only legitimate methods of moving in the matter of an Officer's apparent unsuitability for the service. On no account should a Commanding Officer assume the responsibility of advising a subordinate to resign. By so doing he not only trenches on the functions of higher authority but also, needlessly, assumes of the office of judge in a case when it must be most difficult for him to be sure that he is not insensibly prejudiced.

3. Concerning prejudice, there is an idea latent in some minds that Confidential Reports are liable to be made a vehicle for the satisfaction of a dislike which is merely personal. It may be well, therefore, to state that the General Commanding-in-Chief has been watching very closely for the appearance of any such tendency and that he does not believe it exists at present in any of the units serving under his Command.

4. Another question, originally raised on enquiries made in regard to some of the entries in Confidential Reports, is the very small proporton of Officers serving in the Southern Command who seem to possess a knowledge of German, or even of the French language.

The English system of educating the bodies and the characters, rather than the minds, of the upper classes must necessarily leave much to be acquired by Officers after they have obtained their Commissions, and the most fruitful course which such secondary education can take is usually to be found in the attainment of a competent knowledge of French and German. Officers are better placed than most civilians in this respect, for one of the most obvious of those advantages which render the military career preferable to all others is that in its junior grades much of the work is of a comparatively light, out-of-doors description which does not overfatigue the brain or render it incapable of coping with fresh enterprises when the business of the day is at an end. Foreign technical works are

Home. rarely translated into English and yet, unless such works are occasionally studied by British Officers, they cannot possibly hope to keep in touch with continental military opinion. The General Commanding-in-Chief is, therefore, desirous that Officers should turn their attention closely to the Regulations relating to the study of Foreign languages, issued with Army Orders dated 1st June, 1907, and to his intention to expend the sum of money allotted under these Regulations to the Southern Command in providing candidates with preliminary tuition in French and German.

The pecuniary rewards now given by the War Office to interpreters in French and German are sufficient, if not to pay all expenses incurred, at any rate materially to assist Officers in reaching the standard required. Many Officers are not rich, and are hardly able to afford to take leave at all; if they do take leave it very often consists in going home and sitting there quietly all the time simply because they have not the money to do otherwise. By spending their leave abroad and subsequently passing the Interpreter's examination, they will not only broaden their sources of obtaining military knowledge, but should also be enabled to enjoy the manifold advantages of foreign travel at but little expense to themselves.

H. S. BAIKIE, *Major*,
Assistant Military Secretary,
Southern Command.

Headquarters, Southern Command,
Tidworth House, Andover,
25th January, 1908.

Austria-Hungary. *Machine Guns.*—As a result of the experiments, of which mention has frequently been made in THE JOURNAL, it has been decided by the Austrian Military Authorities to organise machine-gun detachments, which will be raised in 1908 and 1909. The machine-gun question has been very seriously studied in Austria, and it is, therefore, of interest to see the conclusions which have been arrived at in that country, of which the *Internationale Revue über die gesamten Armeen und Flotten* gives the following complete information:—

Up to the present the two Vienna and Cracow cavalry regiments alone each possess a machine-gun detachment; in addition four machine-gun cadres are distributed between the IIIrd and XIVth Army Corps, three machine-gun cadres in the XVth Army Corps, and two similar cadres in the Zara Military Command, in Dalmatia. The five cavalry divisions will each, in future, have a machine-gun detachment (the two divisions at Vienna and Cracow have already each one, and the others will be formed in Lemberg, Stanislaw and Jaroslaw).

It is further contemplated, should the necessary means be forthcoming, to give machine guns to the nine unattached cavalry brigades, so that in time the whole of the Austrian cavalry will be furnished with that arm. The effective of a cavalry machine-gun detachment consists of one captain, two lieutenants, 43 men and 60 horses (of which six are officers' chargers, 42 saddle, and 12 pack horses); each machine-gun detachment is divided into two sections of two machine-guns each; to each machine-gun are attached a pack horse for carrying the gun, and two horses for carrying the ammunition (amounting altogether to 14,000 rounds). With regard to mountain machine-guns, a detachment will first be attached to each of the twelve brigades of mountain infantry belonging to the XVth Army Corps, the Zara Military Command and the Tyrolean Landwehr and Jaeger regiments, which later are to be changed into mountain

Austria-Hungary.

troops. The organisation of these detachments is similar to those of the cavalry, only the pack-horses will carry altogether 16,000 rounds. The detachment has a peace effective of three officers, 64 men and 21 saddle and pack horses.

The Schwarzlose machine-gun, Model 1907, was selected from the two systems experimented with. The training of officers and men for all the new machine-gun detachments is completed by a six-months' course at the Leitha School of Musketry, where a course for this purpose has already been started.

Differing from the field units, the fortress artillery is armed with the Maxim machine-gun, or with the Salvator-Dormus rifle in place of the machine-gun.

The great importance attached by the Austro-Hungarian military authorities to machine-guns is shown by the fact that although the organisation is by no means completed, they have already issued preliminary regulations on machine-gun fire. The general dispositions of the new regulations first insist on the great rapidity and accuracy of machine-gun fire within a limited space, and calculates the fire-power of a machine-gun as equal to that of a section of infantry. It is, however, distinctly stated that this only exists when machine-guns are judiciously and skilfully handled, and if the conduct of the fire is energetic and appropriate. The importance of the training of the non-commissioned officer in charge of the gun, in the proper handling of the arm, in its entire use, in the rapid judging of distances, as well as in the observation of the fall of the bullets and their effect on the target is clearly demonstrated and pointed to as the object to be attained in all instruction.

The musketry training is divided into: Preparatory instruction; instructional firing; firing exercises and field firing. For machine-guns there is only one class of fire.

The commander of the detachment has entire responsibility for the training and firing of his subordinates. He should try and inculcate, in both officers and men, the greatest initiative compatible with fire discipline. He is charged with the training of capable gun-layers and instructors and of the numerous gun captains. In order that, owing to possible losses, the continuation of the firing should not suffer, not only the officers and captains of guns should be trained in the manœuvring of the machine-gun, but also the whole of the rest of the effective. Therefore, too, as many private soldiers as possible should be taught to judge distance and take ranges.

France.

Recruiting Statistics for 1906.—The number of young men of the 1905 class entered on the lists in January, 1906, amounted to 326,793, an increase of 4,864 on the preceding class. By adding those put back from 1904 (56,635), and from 1903 (28,908), the recruiting resources reached a total of 412,336, distributed as follows:—

Exempt as unfit for service, deceased, etc.	33,777
Debarred from service (convicts, etc.)	82
Put back	68,526
Having obtained a reprieve...	1,893
Enrolled in the Auxiliary Services	28,131
Naturalised and on account of age exempt from service in the Regular Army	1,153
Serving as Volunteers in the Army (*a*)	25,348
Serving as Volunteers in the Navy	4,923
Enrolled in the combatant branches (*b*)	248,503
Total	412,336

France.

4,154 men of the contingent enrolled in the combatant branches were posted to the Colonial troops and to the Navy. The Home Army contingent was thus reduced to 244,319 men.

During the year the number of young men who enlisted before reaching the age for military service amounted to 20,038 in the Home Army and to 1,617 in the Colonial troops.

By adding these to the numbers mentioned under the figures (*a*) and (*b*) a total of 295,506 men is obtained for the 1906 contingent, of whom 289,735 were drafted into the Home Army. In these numbers are included 11,669 who failed to appear, but who were enrolled as though present. On the other hand, under Article 19 of the Regulation of the 21st March, 1905, 11,427 men of the 1905 class enrolled in the auxiliary services, who up to then had been exempt from all service in peace time, were obliged to serve for two years in certain sedentary employments. Including these men the total contingent of the Home Army amounted to 289,735 + 11,427 = 301,162 men.

The 248,503 men of the combatant branches, the 11,427 men of the auxiliary services, and the 21,655 men who enlisted before the age for military service were distributed amongst the various arms as follows :—

	Combatant Branches.	Auxiliary Services.	Total.	Enlisted for 3, 4, and 5 years.	Grand Total.
Home Army.					
Infantry	173,587	520	174,107	12,190	186,297
Cavalry	24,320	860	25,180	4,230	29,410
Artillery	32,462	4,546	37,008	2,494	39,502
Engineers	6,250	1,455	7,705	695	8,398
Transport	2,630	104	2,754	431	3,165
Administration	5,100	3,942	9,042	—	9,042
Total	244,349	11,427	255,776	20,038	275,814
Colonial Army and Navy.					
Crews for Navy	16	—	16	—	16
Colonial Infantry	3,100	—	3,100	1,356	4,456
Colonial Artillery	1,038	—	1,038	261	1,299
Total	4,154	—	4,154	1,617	3,771
Grand total	248,505	11,427	259,930	21,655	281,585

The contingent of those called to the Home Army thus shows an increase of 34,672 over the 1904 class. As regards education the 326,793 recruits inscribed on the list are made up as follows :—

11,044 neither read or write.
5,086 can read only.
78,001 can read and write.
208,012 have a more developed primary education.
6,266 are in possession of certificates of primary education.
6,988 have university degrees.
16,396 of whom nothing was known.

The calling to the colours of the men of the 1905 class took place on the 6th, 7th, 8th and 9th October, 1906.—*Bulletin de la Presse et de la Bibliographie Militaires.*

France.

Army Reorganisation.—Under the reorganisation of the French Army now in progress some important changes are contemplated. Thus the infantry will consist of 173 regiments of the line, of which 158 will be of three battalions of four companies, one Corsican, of four battalions of four companies each. There are now thirty-one chasseur battalions of five or six companies each, four regiments of Zouaves of five battalions of four companies each, two foreign regiments of six battalions of four companies each, plus two depôt companies, and four battalions of Algerian light infantry of four companies per battalion. The infantry is augmented by a certain number of Sahara companies (not yet decided on).

The cavalry consists of eighty-nine regiments thus divided: Twelve regiments of cuirassiers, thirty-two regiments of dragoons, thirty-five regiments of light cavalry (of which twenty-one are chasseurs and fourteen hussars), six regiments of Chasseurs d'Afrique (stationed in Algeria or Tunis), and four regiments Spahis (natives). Of the regiments in France, some are attached to army corps, others constituted in brigades and divisions outside the army corps formations. The cuirassier regiments have four squadrons, the other cavalry regiments five squadrons each. There are seventeen groups of remounts, riding-schools, etc.

The artillery consists of eleven foot regiments garrisoned in France and one in Algeria, seventy-four regiments of field artillery in France and one in Algeria and Tunis. An artillery regiment comprises the batteries, workmen's sections, and companies of ditto. The engineers consist of six regiments of sappers and miners (in all twenty battalions, forming seventy-two companies), of one battalion of sapper-balloonists of four companies, with a pigeon-post detachment. Each regiment of sappers and miners has a company of sapper drivers. There is one battalion of sapper-pontooners of six companies, with a detachment of drivers, and one regiment of railway sappers of three battalions of four companies each, and one battalion of engineers, forming a special corps for service in Algeria or Tunis, comprising six companies of sapper-miners, one company of railway sappers, a detachment of sapper-telegraphists, and a detachment of sapper drivers. The military train is composed of twenty squadrons, of three companies each, stationed in France; three squadrons (of which two are of two or three companies, and one of four companies) stationed in Algeria or Tunis. The strength of all these troops is shown in Tables A, B, C, D, E., annexed to the law constituting the troops as above, which is called "La Loi des Cadres."

The army then, to sum up, comprises: (1) The corps of all arms, infantry, cavalry, artillery, engineers and military train. (2) The *personnel* of the General Staff and the various services, to wit: General Staff of the army, service of ditto, control of administration of the army. (3) The *personnel* of staffs and particular services including the four arms, intendance, clerks, military sanitary staff, administration of hygiene, orderlies, veterinary staffs, recruiting ditto, mobilisation, depôts, pay department, posts, telegraphs, railways, explosives, military schools, military law and justice, remounts, native troops, Algeria, etc. (4) The Gendarmerie. (5) The regiment of firemen of the city of Paris. The effective in horses for various troops represents the mean annual effective kept up by each, which must not be lowered, and the reinforcements in horses as approved by ministerial decree. This very necessary arrangement for keeping the supply of horses up to some fixed effective might be applied with advantage in our own army, which takes horses from one arm in peace time to fill the vacancies in another, a system utterly contrary to the

France. rules of military science (not to mention common-sense), and dangerous as giving a false idea of effective strengths of mounted troops.—*U.S. Army and Navy Journal.*

Germany. *Recruiting for 1906.*—The official report of the recruiting operations for 1906, presented to the Reichstag on November 14th, 1907, shows the following results: —

The number of young men on whom the Revision Boards had to report in 1906 was 1,145,386,[1] composed as follows:

Young men of 20 years to be examined for the first time	511,209
Young men of 21 years	337,836
Young men of 22 years	256,761
Older	39,580
Total ...	1,145,386

These young men, entered on the recruiting lists for 1906 and the preceding years, were distributed as follows:

Debarred from service	921
Unfit for service	33,327
Put back	658,870
Men of 20 years or older, who enlisted as Volunteers	31,189[2]
Fit for service	421,079
Total	1,145,386

The 421,079 men passed fit for service were classified as follows:

In the Landsturm (1st Levy).

1.	On account of their civilian position	533	116,584
2.	In excess[3]	19	
3.	For various reasons	116,032	

In the Ersatz (Reserve of Territorial Army.)

1.	On account of civilian position...	7,572	82,846
2.	In excess[3]	1,802	
3.	For various reasons	73,472	

In the Ersatz (Naval Reserve).

1.	On account of civilian position...	80	1,654
2.	In excess[3]	7	
3.	For various reasons	1,567	

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[1] In these numbers are not included the men who failed to appear, and those who could not be found. The number of these has not been given since 1903, when they amounted to 130,000 men.

[2] Viz.: 29,828 in the Territorial Army and 1,361 in the Navy.

[3] Men classified as "in excess" are liable to be called to the colours in case of deficit in the men posted to the Territorial Army or the Navy.

Germany.

In the Territorial Army.

1.	In the combatant branch[1]	207,935	211,093
2.	In the non-combatant branch	3,158	
1.	Men from inland	5,758	8,902
2.	Men from maritime population...	3,144	
	Total		421,079

From an age point of view the men enrolled in the Territorial Army and the Navy were thus distributed :

Youths of 20	103,962
Youths of 21	52,954
Youths of 22	61,108
Older	1,971
Total	219,995

The number of voluntary enlistments during the year 1906 were 52,002 in the Territorial Army and 3,406 in the Navy. These enlistments are thus distributed :

Territorial Army.

Voluntary one-year enlistments :

Before 20 years	1,283	10,833
At 20 years	9,550	

Instructors and candidates for the duties of Public instruction not included in preceding list :—

Before 20 years	7	847
At 20 years	840	

Other Categories.

Before 20 years	20,884	40,322[2]
After 20 years	19,348	
Total		52,002

Navy.

One year's voluntary enlistments	579
Other categories	2,827
Total	3,406

As regards more especially the Territorial Army, the total number of young men who entered the Regular Army in 1906 was, therefore, made up as follows :

Men enrolled	219,995
Men of 20 or older, who enlisted voluntarily ...	29,828[3]
Youths who enlisted voluntarily before 20 ...	22,174[3]
Total	271,997

A comparative examination of the recruiting reports for 1905 and 1906 shows that, in the space of one year, the number of youths entered on the recruiting lists has increased by 39,570, and that the number of enrolments, in the Territorial Army alone, has increased by 10,117.—*Revue Militaire des Armées Etrangères.*

[1] Viz. : 2,214 for one year's service (in the transport), 192,954 for two years' service (in branches other than cavalry and horse artillery), and 12,767 for three years' service (in cavalry and horse artillery).

[2] 30,780 of whom are for two, and 9,542 for three years.

[3] Including one-year volunteers.

Germany. *Evolution of Tactics.*—Under the title of "The Evolution of Tactics under the Influence of Modern Armament," the *Magdaburgische Zeitung* has recently published a most interesting article, which has been reproduced by the *Internationale Revue über die gesamten Armeen und Flotten*. The following is a translation of a portion of the same :—

In many ways, at the present time, the duties of commanders of all ranks have become far more difficult. The cavalry officer is the only one now who really commands his men in the old meaning of the word. The action exercised by the infantry officer over groups of skirmishers, either by personal intervention or by his example, do not manifest themselves directly and must necessarily be limited. The influence of a commander of high rank is confined on his side to sending forces into action for the purpose of reinforcing the first line with the aid of units held in reserve, and, finally, to the instructions given to the artillery.

The modern fire-fight, which lasts for hours and hours, certainly causes severe shocks to the nervous system, but it would, nevertheless, be wrong to be pessimistic with regard to the difficulties presented in the conduct of a modern action. No doubt the effect of modern weapons is terrifying, but even formerly it was not child's play to hurl oneself against hostile lines firing a hail of bullets at short range.

The most serious effect of the lengthy duration of battles is that it exercises a dissolvent action on the troops engaged. It should not, however, be forgotten that in former wars, too, fights took place which lasted for many hours, and battles of several days' duration were fought even previous to the war in Manchuria. Then again, and this is a point of especial importance, the action is carried on at far greater distances than formerly. From all times, too, the training and military education of the troops exercised a greater effect on the issue of a conflict than the qualities of the higher command and the efficiency of the armament. It is true that quite disproportionate losses have been suffered by troops whose armament and commanders were not up to the requirements of this day, but it is never possible to completely avoid such losses, for war has always been, and will always remain, a bloody drama.

At the same time it is certain that if the commanders had been more up-to-date, and if the troops had been better trained, the number of victims of the war would have been infinitely less. This statement must not be regarded as a facile criticism nor a condemnation of commanders and troops, who did their duty and bore themselves bravely in past wars. Critical comments on military events of the past are indispensable in order to show how much it is necessary to constantly improve on tactical dogmas, and to assist the army to accustom itself, in a rational manner, to modern exigencies. The new German Drill Regulations have essentially that object in view, but it would be erroneous to see in them the final conclusion of the evolution of tactics.

It would, however, appear as though this evolution had now reached a dead point, and that a period of calm will succeed. Science will always progress without stopping, but as regards infantry armament she will probably produce no innovation of transcendent tactical importance, for it would seem that the lowest possible limit of the small calibres in small arms has been reached. The machine-gun question has not yet been definitely solved. The artillery, for its part, will continue to further perfect its projectiles and increase their efficacy. It does not, however, appear possible to increase the rapidity of fire of barrel-recoiling guns, on account of the difficulty of replacing the ammunition. The Russo-Japanese war

Germany. has proved that, as regards firing, artillery has already, in a measure, exceeded the limit where observation is still possible.

If a belief in the exaggeratedly great effects of modern fire should be abandoned, so must also the idea that this fire power will primarily be of advantage to the defensive. New weapons simply necessitate a rational mode of attack, that is to say, a method by which the attacker relies more on his fire than on his legs. The modern attack by fire differs altogether from the former advance on the enemy. Everything in the slightest degree resembling the latter should be abolished. The modern officer should, in many ways, modify the significance of the term "bravery." At the present time war requires far greater reflection, cerebral activity, than formerly. An endeavour is made to develop the individual intelligence of the skirmisher by making him constantly work over the ground and by accompanying him during this practical work with advice and instruction. There is less need for the officer to give himself up to the higher studies, than to ceaselessly exercise himself, either with or without his men, over the country and on the map, if he wishes to attain the necessary height of efficiency. Such work strongly develops the faculty of imagination, which causes one to see things with the eyes of intelligence as one sees objects with the ordinary vision. The intellectual exercises to which the officer should devote himself with a view to his duties in war form, nowadays, the major portion of "uninterrupted application" which Frederick II. demanded of those who aspired to the honour of commanding his troops.

United States. *Report of the Chief of Staff.*—The annual report of Major-General J. Franklin Bell, Chief of Staff, reviews the history of the Army during the fiscal year; describes the work of the General Staff, and makes various important recommendations for the improvement of the Service. The encampments are described as highly beneficial, though it was not found practicable to carry them out on so large a scale as heretofore.

Attention is called to the necessity of filling the vacancies in the line caused by the detachment of 682 officers who are engaged upon work so important that their number should be increased rather than diminished. The permanent separation of the Coast and Field Artillery is approved as of "undoubted wisdom." For the first time the Field Artillery has a modern and efficient organisation.

An increase in the Army is recommended, a reorganisation and increase of the Medical Department; the establishment of a General Service Corps and a restoration of the canteen. Regular and special reports made from time to time establish the fact that the Army, from the lowest rank up, is practically unanimous in its desire to have the canteen re-established. Even many officers who, on principle, are opposed to the use of intoxicating liquors, realise that such use cannot be prevented and that the sale of beer at post exchanges would be the lesser evil.

Congress is urged to provide for an adequate supply of reserve ammunition. More Staff officers are needed to provide for the increased Army, especially in the Q.M. Department.

A reorganisation of the Army is recommended to adapt it to rapid and relatively great expansion upon the outbreak of war. Infantry companies should have in peace not less than 150 men each, and Cavalry troops not less than 100 men. In time of war Infantry companies should have 250, and cavalry troops 150 men.

United States.

"It is a modest assumption," the report says, "to say that the United States will, if involved in war with any first-class foreign power, require the immediate mobilisation of 250,000 men, to be speedily followed by as many more, with a possible ultimate additional increase of four times that number."

"It is proposed to outline here an organisation for this purpose which will require an increase of not less than ten additional regiments of infantry, two regiments of Field Artillery and a reorganisation of the cavalry of our Regular Army as now authorised by law. To reduce the necessary increase to a minimum, it is proposed that one-third of the Army Corps, or one complete division, shall be troops from the organised militia. This plan might be made a great incentive to better peace training by including in the annual mobilisation scheme only those units of militia which reach the highest efficiency as shown by reports of the inspecting officers."

"One division, 18,000 troops, is, of course, not sufficient to meet any need at a time when isolation has become a thing of the past, and we have points of possible friction in so many directions. That we can at first in any popular outburst raise volunteers in great numbers may be admitted. We have the men, the money, etc., but we will not have the time to convert these men into soldiers able to cope with the trained soldiers of other nations. We should not allow ourselves to nurse a false sense of security, or continue to entertain the illusion that a brave but untrained, unorganised people can grapple successfully with another nation better trained and organised. It can safely be relied upon that the remoteness of war largely depends upon preparation to meet it. Unless other great nations are wrong and wasting time and money, they are giving us an object lesson which Americans will some time have to learn by costly and humiliating experience, and which it is the urgent duty of professional soldiers to point out; namely, that time and training are both necessary to convert an untrained volunteer into a soldier, whether for infantry, cavalry, artillery, engineers, or signal corps. The last great war clearly demonstrated that the side which is ready and acts promptly gains a decisive advantage.

"The engineer force as now organised is insufficient for the needs even of proper peace training of the Army. During the past two years on not less than ten or twelve occasions actual necessities for engineer troops have arisen which could not be met because of the relative smallness of this branch of the Service."

General Bell also mentions the necessity for legislation defining the status of the Porto Rican Regiment; a law regulating the organisation of volunteers and several other minor necessities.

Report of the Adjutant-General.—The report of Major-General Ainsworth, Adjutant-General of the Army, shows that on June 31, 1907, there were 3,797 officers and 59,827 enlisted men in the Army, besides 3,319 enlisted men of the Hospital Corps. This is an increase of forty officers and a decrease of 5,118 men on the totals of last year, and an aggregate deficiency of 20,535 compared with the present authorised strength of 75,643, the increase in which is mainly in the Artillery. Last year at the same time the deficiency was only 8,046 in the authorised strength of 68,272 officers and men, not including the Hospital Corps. The utmost efforts of the recruiting officers failed to make good the losses.

United States. The enlistments up to June 30, 1907, were 12,799, and the re-enlistments, 7,144; last year they were 15,178 and 8,835, and in 1905, 20,264 enlistments and 13,140 re-enlistments. General Ainsworth says :—

"The present enlisted strength of the Army, not including the Hospital Corps, is 50,190 enlisted men. To fill vacancies caused by expiration of service, and to replace men lost from other causes among this number of men, will require over 2,400 enlistments and re-enlistments monthly. During the calendar year 1906 the average number of enlistments and re-enlistments each month was only 1,427. During the first nine months of the present year that average has increased to 2,052, but even with this increase the enlistments and re-enlistments are insufficient to maintain the Army at its present strength, much less to aid in meeting the increase in the authorised strength resulting from the increase in the Artillery.

"The Government, in its efforts to procure men for the Army, is now competing everywhere with private employers who are able to offer men much greater inducements than the Government now offers, at least in the matter of pay. If present conditions continue there will be nothing for the Government to do but to meet this competition by materially increasing the soldier's pay, or to evade the competition altogether by a resort to conscription.

"The re-enlistment for the infantry in 1907 were relatively much less than in 1906, while the re-enlistments for the mounted branches of the Service and the Coast Artillery were relatively larger, to a small extent at least, in 1907 than in 1906.

"The principal reasons advanced for the large number of desertions and the falling off in the number of enlistments are (*a*) the low rate of pay as compared with that obtaining in civil life; (*b*) dissatisfaction with the hard work of practice marches, drills, and the fatigue duties necessary to keep a post in good condition; (*c*) the abolition of the canteen feature of the post exchange; (*d*) failure of recruits to appreciate the obligations of a contract and their ignorance of the character of the crime of desertion; (*e*) frequent changes of company officers, due to a shortage of officers; and (*f*) the lack of experienced, capable, well paid, and satisfied non-commissioned officers. . . . The means for the removal of the stated causes are obvious, and are, to a considerable extent, beyond the control of the War Department, in that it will require legislation by Congress both to increase the pay and restore the canteen."

The geographical distribution of the Army on Oct. 15, 1907, was as follows: In the United States, 2,625 officers, 33,860 enlisted men; in Alaska, 52 officers, 1,011 enlisted men; in the Philippines—Regular Army, 688 officers, 12,896 enlisted men; Philippine Scouts, 116 officers, 4,346 enlisted men; in Porto Rico—Regular Army, 3 officers, 29 enlisted men; Porto Rico Provisional Regiment, 24 officers, 572 enlisted men; in Cuba, 276 officers, 4,437 enlisted men; in Hawaii, 12 officers, 209 enlisted men; troops en route and officers at other foreign stations, 94 officers, 1,148 enlisted men; total, 3,890 officers, 58,508 enlisted men. This includes 3,400 enlisted men of the Hospital Corps, distributed as follows: United States, 3,223; Alaska, 41; Philippines, 805; Porto Rico, 23; Cuba, 255; Hawaii, 13; en route, 40.

During the fiscal year 283 officers and 3,098 men were sent to the Philippines. The largest number stationed there at any one time was 2,662 officers and 66,758 enlisted men, in December, 1900.

Of 155 second-lieutenants appointed, 110 were graduates, of whom eight went to the engineers, 25 to the cavalry, 18 to the field artillery, and

United States.

52 to the infantry. Eight enlisted men and two civilians were appointed to the cavalry, one enlisted man and four civilians to the coast artillery, two enlisted men and five civilians to the field artillery, and 16 enlisted men and eight civilians to the infantry; a total of 45 enlisted men and civilians to fill the 98 vacancies left for them. Of the 62 competing candidates examined for commissions only three were honour graduates, two principals, and one alternate. The number authorised was six of each.

On June 30, 1907, there were 3,056 commissioned officers in service in the Regular Army. Of these 900 (including 55 chaplains) were general officers or officers of the Staff corps and departments, 722 belonged to the cavalry, 153 to the field artillery, 451 to the coast artillery, not including the Chief of Artillery, and 1,429 to the infantry. Of the general and staff officers 779 were present for duty, 16 were absent sick, 37 on leave, and 68 on detached duty. Of the 2,756 line officers, 2,008 were present for duty, 32 were absent sick, 101 on leave, 614 on detached duty, and one in arrest. From this it appears that at the close of the fiscal year 27·14 per cent. of the line officers and 13·45 per cent. of the general and staff officers were absent from their commands. At the close of the preceding fiscal year 27·45 per cent. of the line officers and 12·60 per cent. of the general and staff officers were so absent. This shows that the relative number of general and staff officers absent from their commands is larger, and the relative number of line officers is slightly less, than at the close of the preceding year. The percentages of absentees on June 30, 1906 (but not on June 30, 1907), included the newly-appointed second-lieutenants on graduating leave.

In their annual reports for the fiscal year 1907 the commanding generals of a majority of the military departments invite attention to the large and increasing number of officers of the line absent from their commands on detached service, and to the undesirable effect of such absences upon the discipline and efficiency of the Army. The remedies suggested generally favour an appeal for legislation that will authorise an increase in the number of line officers, the establishment of an extra list from which to obtain officers for detached service, or the filling of vacancies caused by details, generally as is now authorised in the case of details for duty as officers of certain staff corps and departments, rather than a reduction, by legislation or by Executive order, in the number of places that now must be filled by detaching officers from their commands for a longer or shorter period.

On June 30, 1907, there were 82 retired officers under assignment to active duty. At the Soldiers' Home, 3; on recruiting service, 26; with state militia, 20; at educational institutions, 30; in Cuba, 3. Of these five received only retired pay.

During the fiscal year 617 officers were examined and six re-examined for promotion. On the first examination 578 were found qualified, 20 were found professionally or morally disqualified, and, with the exception of one who resigned, were suspended for one year; 19 were found physically disqualified and were retired with the next higher grade. Of the six re-examined after suspension, four were found qualified for promotion and two were found professionally disqualified and were honourably discharged.

On June 30, 1907, there were 939 officers of the Army on the retired list, as follows: Lieutenant-generals, 5; major-generals, 21; brigadier-generals, 263; colonels, 79; lieutenant-colonels, 71; majors, 220; captains, 171; first-lieutenants, 68; second-lieutenants, 15; chaplains, 26. Of the 14 officers who were retired under Section 32 of the Act of Congress approved

United States: July 28, 1866 (14 Stat. L., 337), on account of disability occasioned by wounds received in battle, with the full rank of the command held by them at the time such wounds were received, three were advanced three grades upon retirement, five two grades, and six one grade. All of them, with the exception of two, are included in the 346 officers on the retired list June 30, 1907, who have been advanced one grade because of service during the Civil War.

Eighty-two officers were placed on the retired list during the fiscal year ended June 30, 1907. During the preceding year 80 officers were placed on that list.

Under the act of Congress which authorises the holding of examinations "for the purpose of securing a list of persons specially qualified to hold commissions in any Volunteer force which they may hereafter be called for and organised under the authority of Congress other than a force composed of organised militia," one applicant, from Texas, was examined and was found to be qualified to hold a commission as lieutenant-colonel of infantry. The whole number of certificates of eligibility to hold Volunteer commissions issued under the law before referred to, from the date of its approval, Jan. 21, 1903, up to and including June 30, 1907, was 29.

Twenty-one officers of the organised militia attended Army Service schools during the year. With the exception of one, from Texas, who attended the Staff College, and one, also from Texas, who attended the Army Medical School, those officers attended garrison schools.

The losses in the Army during the year ending June 30, 1907, were as follows:—Officers: Killed in action or died of wounds, disease, etc., 16; resigned or discharged, 49; dismissed, 3; deserted, 2; retired, 82. Enlisted men: Killed in action or died of wounds, disease, etc., 417; discharged upon expiration of term of service, 13,678; discharged for disability, by sentence of court-martial, or by order, 8,401; deserted, 4,532; retired, 259. Total, 27,438. Wounded, 1 officer and 37 enlisted men.

During the preceding fiscal year the number of discharges upon expiration of term of service was 9,948 and during the fiscal year 1905 it was 22,254. Those numbers are 1907, 15·9; 1906, 11·8; 1905, 23·1 per cent. of the whole number of enlisted men in service (or of enlistment contracts in force) during each of those years. The losses from all causes other than expiration of term service in 1907 were 13,355. During the preceding fiscal year those losses were 15,338, and during the fiscal year 1905, 16,559 enlisted men. Those numbers are respectively 16·6, 18·2, and 17·2 per cent. of the whole number of enlisted men in service. The official returns show 4,522 desertions during the fiscal year, 5·6 per cent. of the whole number of enlisted men in service in the Army during that year, as against 7·4 per cent. during the preceding year. The following table shows the percentages of the whole number of enlisted men in service reported to have deserted during each of the fiscal years 1899-1907:

1907	5·6	1902	5·0
1906	7·4	1901	4·1
1905	6·8	1900	4·0
1904	6·6	1899	3·2
1903	7·1	1898	1·6

The decrease this year in the percentage of desertions is ascribed to the re-establishment of the Leavenworth prison and the discontinuance of enlistments at recruiting stations. If the 1,192 men who were accepted at the recruiting depôts and failed to report for enlistment had been

United States.

included as heretofore the percentage for 1907 would have been 7. Of the desertions, 24 per cent. were in the first three months of service, 20 in the second, 10 in the third, and 6 in the fourth three months. The percentage in the first year of service, 13; in the second year, 6; in the third; total, 79 per cent. in the first enlistment, 14 in the second, 5 in the third and 2 per cent. in the fourth and subsequent enlistments. Desertions are much more frequent in the summer than in the winter. The percentages of desertions, by branches of the service, during the fiscal years 1905, 1906, and 1907, are shown in the following table:

Branches of Service.	Per cent.		
	1907	1906.	1905.
Coast Artillery...	6·6	7·8	8·2
Cavalry	6·3	7·2	6·5
Field Artillery	6·0	9·2	9·4
Engineers	5·0	7·7	5·4
Infantry	4·6	6·1	6·3
Hospital Corps...	4·2	5·2	4·0
All others, including unassigned rects.	7·2	12·6	6·2
The Army	5·6	7·4	6·8

If the average enlisted strength is used as a basis, it is found that the number of desertions was 8 per cent. of that strength, as against 10·6 per cent. during the preceding fiscal year. Of the men who deserted, 583 were apprehended and 160 surrendered. Two men were acquitted, the charge was declared erroneous in 18 cases, and 150 men were found guilty of absence without leave, total of 170 cases improperly classed as desertions. If this number is deducted from the 4,522 desertions shown on the returns, there remained 4,352 cases of actual desertion of men from the Army during the year. The causes of desertion are closely allied, in many respects, with the causes of the falling off in the number of re-enlistments.

The following shows the number of discharges of enlisted men ordered by the War Department during the fiscal year ended June 30, 1907, with the reasons for discharge: On account of fraudulent enlistment, 38; desertion, 68; desertion and fraudulent enlistment, 5; imprisonment under sentence of civil court, 86; having become disqualified for service through own misconduct, 10; unfaithful service, 1; in the interest of the Service, 1; in the interest of the United States, 30; for the convenience of the Government, 1; to enter the Soldiers' Home, 11; by purchase, 406; by favour, 40; on certificate of disability after admission to the Government Hospital for the Insane, 83. Total, 780. In addition to the discharges shown in the foregoing, 1,022 discharges on surgeon's certificate of disability were ordered, making a total of 1,105 men discharged on surgeon's certificate of disability during the fiscal year.

In addition to the 406 discharges by purchase shown above, 1,291 discharges were ordered by the commanding officers. There were 1,105 discharges on surgeon's certificate of disability, and 1,697 by purchase, against 1,291 last year. The number of applicants for enlistment rejected was 56,372, or 83 per cent. of the whole number. Of these 1,580 were rejected as aliens and 2,880 as illiterate. The number of original enlistments was 13,748, and re-enlistments, 7,883. Of the original enlistments of white soldiers, 90 per cent. were of men born in the United States.

The increase in the number of qualifications reported in the higher grades of marksmanship during the practice season of 1906 over the

United States.

previous year was very pronounced, 1,157 expert riflemen, 4,629 sharp-shooters, and 4,391 marksmen having been reported as qualified, as against 596 expert riflemen, 3,371 sharp-shooters, and 3,436 marksmen in the season of 1905.

During the year 1,822 military convicts were committed to confinement, 47 escaped convicts were recaptured, 1,597 convicts were released at expiration of sentence, 94 escaped, 6 died, and the whole of the unexecuted parts of the sentences of confinement were remitted in 320 cases, leaving 1,668 military convicts in custody on June 30, 1907.

During the year 512,511 cards were added to the index-record, making the present total of cards 55,194,679, of which 3,855,266 are Confederate military cards. Of the latter 494,825 were prepared during the year. Up to June 30, 1907, 2,520 medals of honour had been awarded. —*U.S. Army and Navy Journal.*

CORRESPONDENCE.

THE POULSEN WAVE IN WIRELESS TELEGRAPHY.

To the Editor of the JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION.

SIR,—"The cable wagon has enabled columns marching at night to keep in constant communication, and has very greatly facilitated the task of ensuring simultaneous attack by two or more columns proceeding to their objective by different routes. It is not impossible that a further advance may be made in this direction by the adaptation of the Poulsen wave in wireless telephony, by which columns may be able to keep in close touch whilst on the move without the danger of having the cable broken in the rear of them."—(Brigadier-General Sir H. S. Rawlinson, speaking at the Royal United Service Institution, December 4th, 1907.)

This remark by General Sir H. Rawlinson in his lecture on "Night Operations" gave rise to some speculation and inquiry as to what were the special merits of the Poulsen wave in wireless telephony from a military point of view, and as to the technical peculiarities of the system.

That it has some special merits is obvious from the remarks quoted, but further evidence of its utility is afforded by the fact that it has been adopted to a considerable extent in the German Army, and I learn from quite impartial German correspondents with scientific knowledge that it is very valuable. Moreover, I believe, though I have no official evidence of this fact, that the War Office has been at last induced to expend a small sum on Poulsen plant.

Any student of history knows the great services of telegraphs in war from 1861-1905. The exact nature of these services are set forth in Hamley, pages 211-213, ed. 1878. But the drawbacks and defects were numerous, among which the principal were that the ordinary telegraph could not be relied upon for news from the enemy's rear, the speed with which field telegraphs can be laid is limited, and if laid in a hostile country they are liable to be cut, or must be protected by detachments of troops. The facility with which aerial telegraphs can be damaged and tapped

compels recourse to subterranean lines, which are concealed more easily. But the expense and trouble of constructing these are enormous.

Spark Telegraphy.

The result was that once the possibilities of wireless telegraphy were known it was eagerly adopted. The expense connected with spark telegraphic communication was trifling compared with that of the installation and maintenance of the old wire system. But serious disadvantages were soon apparent. The spark system was unreliable in working and can only be installed with advantage where favourable climatic conditions exist, and a great waste of energy takes place even then. But as secrecy is one of the principles of successful strategy, and as secrecy is impossible under the spark system, this objection was fatal in the larger operations of war. Intercommunication between several points in close proximity without one interfering with another was impossible with the spark system, Hence tapping messages was as frequent under wireless telegraphy as when the Confederate partisan chief, Morgan, sent messages to Federal commanders on their own wires "without the least regard to truth."

Secrecy.

I think the secrecy which can be maintained under the Poulsen system of undamped continuous waves is the principal, and indeed a vital strategic merit of the new system. Of this there can be no doubt. It has been proved to me by a former pupil who is an expert on these subjects. I am not an electric expert myself, nor are most of my readers. Hence I will shortly summarise his explanation as simply as possible.

With a view to improving wireless telegraphy numerous attempts have been made to provide undamped continuous waves. In 1899 an English physicist, Duddell, discovered the following phenomenon: When an alternating current circuit of suitable capacity and self-induction is connected in parallel with an electric arc fed by direct current, the arc will, under certain conditions, emit a musical note. At the same time an alternating current is produced in the shunt-circuit, having the same rate of vibration as the note produced by the arc. The rate of oscillation thus obtained, though comparatively high, was, however, from the point of view of radio-telegraphy, much too low, and the energy far too feeble.

After a series of exhaustive experiments, Mr. Valdemar Poulsen finally discovered a method of obtaining a much higher rate of frequency, namely, a million or more vibrations per second. This he accomplished by employing a method similar to that of Duddell, but with the arc immersed in an atmosphere composed of or containing hydrogen.

Arc System.

If the arc is brought under the influence of a strong magnetic field, the potential difference of the electrodes becomes very great in proportion to the length of the arc. For instance, 440 volts may correspond to a length of arc of only three millimetres. Experiments have shown that the employment of the magnetic field gives greater working efficiency than can be obtained without it. The devices employed for utilising this new kind of undamped continuous waves are now briefly described:—

The Transmitter.

In this there are two points of special interest, namely, the coupling and the signalling.

Coupling.—First, the antennæ can have a part of it serving as a portion of the oscillation circuit in which the arc is inserted so that the oscillations are created in the antennæ itself, or, secondly, a close or loose coupling in which the antennæ gathers energy from the primary generating circuit can be adopted. If the coupling be neither absolutely close nor absolutely loose the frequency of the system will not be sufficiently defined, since the arc may develop one or two frequencies. We therefore generally use a close or a very loose coupling. In this connection the difference between the old and the new system manifests itself to a marked degree. If in the spark system it is attempted to attain any result in the way of selectivity, a loose coupling is essential; in the new system, however, the tuning is equally sharp with either a close or a loose coupling.

A happy simile compares spark-telegraphy to gun-fire, whereas it compared the Poulsen system to a continual flow of pure musical tones, but with this difference, that the tones emitted by the Poulsen transmitter, are of the same intensity as the gun-shots. Fortunately, for simultaneous multiple telegraph the latter are not at all necessary; and given the same height of mast, the same method of receiving and the same sensitiveness and we can do with considerably less power.

The principles and details of construction are the same with all installations. It makes it simpler, of course, when the necessary electrical energy can be obtained from other sources.

As far as electrical machines are concerned only one direct-current double machine is required instead of the three machines required in spark telegraphic stations. This double machine can be driven by the petrol engine, and gives a direct current of a 100-130 volts, as well as one of 400-600 volts.

The accumulator batteries are charged at about 100-130 volts and they feed the Poulsen transmitter through the transformer with a current of 400-600 volts. Two shunt-regulators determine the tension between these limits. The double machine fulfils yet a further function. When not coupled to the petrol motor, but fed instead by the current from the accumulator battery, it serves as a direct current transformer, the low tension side of the machine running as a motor while the high tension side supplies the current to the station.

All that is now required is a starter, and as the starting takes place without any load, this may be very small. In this way we arrive at a fourth use of the machine, namely, the starting of the motor by mechanical means, whereby the low tension side of the machine functions as an electromotor.

It is only necessary for us to make use of the well-known acoustical phenomenon of resonance and we can be certain of obtaining the same result with a train of waves having a very great initial amplitude. Freedom from interference has also increased to such an extent that to-day we can speak of a really reliable freedom from wave interference and of multiple telegraph being accomplished facts. Besides the two above-mentioned, or three if we add telephony, there are many other advantages, but for the non-technical man these three chief advantages over-ride all others, for an expert, however, who is conversant with electrical details, it is another matter. The exclusive use of a direct current, the dispensing with the whole high-tension plant (instead of 50,000-80,000 volts we use only 400-500), the increased simplicity of installation, tuning and manipulation of the station (the automatic reversing performed by the key) from the transmitting to the receiving position, the complete absence of sound

in the working and the considerable smaller space required for the apparatus are some of its advantages.

Portable Sets.

Before the introduction of the Poulsen system, no really efficient portable set had been manufactured, inasmuch as, however perfect may have been the mechanical devices for transmitting and receiving the energy generated in the oscillation circuit there still remained the defect, fatal to all spark-telegraphic systems, namely, the possibility of interference and of messages going astray.

In the Poulsen sets the primary necessities of a light mast and a light source of energy have been fulfilled as well as the necessity of having a form of radio-telegraphic apparatus that could be readily transported, even over bad roads, without being easily damaged during transit.

Great Strategic Value.

Taking into consideration as well what has already been said on the subject of secrecy in the working of the Poulsen system, and also the fact that far less energy is required for practical working than heretofore, the strategic value of the Poulsen portable sets can hardly be exaggerated.

The utility of this means of communication is self-evident, as it provides the commander of an invading force with the only means of communication with ships at sea. Thanks to radio-telegraphy and the Poulsen system of undamped continuous waves, the disadvantages under which a divided force operates against a concentrated force will be diminished to a considerable degree, owing to the fact that all portions of the divided force can be in constant and reliable communication without the danger of their lines being cut or tapped as was formerly the case with the wire systems, or of their messages being intercepted and read, as is the case with spark-telegraphic systems. Again, for the same reasons, radio-telegraphy will in future enable a general to divide his army, whether for attack or defence, with much more confidence than hitherto.

In the field, too, for tactical as well as strategical positions its advantages are manifold, for, not only does it offer all the advantages of the wire systems, whereby a general can keep himself acquainted with the position of the various portions of the force under his command, but it possesses the additional advantage that the enemy cannot possibly interfere with or intercept the messages.

Another very important feature of the Poulsen system from a commercial as well as a military point of view is that the number of messages that can be received from the different stations at one and the same time is only limited by the number of sets of receiving apparatus that can be conveniently installed.

There is much more that I might say had I space, but I must content myself with indicating some merits of the system rather than attempting to set forth details of its *modus operandi*. I know that most admirable and remarkable results have been obtained already, and I leave the further discussion of this most important subject to the scientific men who are revolutionising the methods of International communications as well as materially modifying the operations of war.

Yours truly,

T. Miller Maguire.

THE QUID PRO QUO.

To the Editor of the JOURNAL OF THE ROYAL UNITED SERVICE INSTITUTION.

SIR,—How to find the men for the Territorial Army and how to provide Old Age Pensions, are two problems of first-rate importance which will present themselves for solution at an early date. That they have not been hitherto treated as part of the same problem is sufficient excuse for doing so now.

The principal difficulty in dealing with them separately is the finding of a necessary *quid pro quo;* treated together, each provides the complement of the other.

The Territorial Army, however grand in its conception, will stand or fall, as a measure of practical defence for this country, upon the question of numbers and efficiency.

The supply of men and the amount of training and discipline to which they will submit themselves is the keystone of the edifice.

If on the one hand we rely on patriotism to obtain citizens who will lend themselves to being turned into efficient soldiers, the chances are greatly against adequate numbers.

If, on the other hand, in order to obtain the required numbers, conditions of service are made easy, efficiency will suffer, and we shall not be better off in this respect than before the introduction of Mr. Haldane's measure.

In neither case should we have an Army.

Mr. Haldane is relying almost entirely on the patriotism of the nation and, in addition, is offering the Territorial Army an improved status to that enjoyed by the Volunteers, and granting to its members exemptions from certain insignificant civil obligations.

There is great hope on all sides that his optimism is not misplaced, but nowhere are his inducements considered to have much value.

Among those able to judge, considerable doubt is expressed as to whether the nation will rise to the occasion. It is felt that the great spirit of patriotism necessary, to make this Territorial Army a success, will have to be almost entirely manufactured by a long process of education. Some say it can only be stirred by a national disaster.

Yet in anticipation of this Territorial Army, Regular battalions have been disbanded.

Another body of thinkers consider that in the event of the scheme being unsuccessful the only alternative is compulsory service in some form or other.

The National Service League and sympathisers with its propaganda would welcome this solution, but in a democratic country without that same spirit of patriotism required to make the Territorial Army a success their aims would not be attained without a very great change in the opinion of the people as a whole. Can we substitute a policy?

In the absence of the necessary spirit of patriotism, assuming that it is absent, is there any method short of compulsory service by which we can induce the able-bodied men of this country to offer their services to the State; the employers to submit to the loss of the men's services while they are undergoing training; and at the same time satisfy the military demands as to training and discipline?

Let us look at the requirements of a defensive force from three points of view, from that of the Soldier, the Citizen, and the Citizen Soldier.

From the military point of view the great desideratum is some lever by which to enforce training and discipline, without which an armed body is comparatively worthless against modern troops.

From the civilian point of view a system is required which will, at a low cost, provide sufficient defence without dislocating commercial life.

From a Volunteer point of view there should be some compensation for loss of time and money devoted gratuitously to defence, and some recognition by the State and the remainder of the population for their doing what they rightly consider the duty of every citizen.

In thus briefly summarising these three aspects we are only considering the best opinion in each case. Too often military opinion undervalues the worth of the Volunteers. Far too often the civilian has never given a thought to defence, and is wrapt up in self, while in the Volunteer Force too many are actuated by other motives than patriotism in joining the ranks.

To turn to the subject of Old Age Pensions, three main difficulties stand in the way of providing the worthy citizen over a certain age with a weekly pension. They are: firstly, want of money; secondly, the want of a standard by which to distinguish the worthy from the worthless, the worker from the idler, and to gauge the amount of benefit to the community the work of any particular citizen has been; and, thirdly, the consideration of the propriety of pauperising the lower classes, of destroying the spirit of individualism, which is the mainspring of industry, and substituting for it a debased Socialism, which would lead the State to endow every citizen, whether he had benefited the State or been a burden on its resources.

From a consideration of these difficulties we arrive at what is required of an Old Age Pension scheme.

First, we must have the most economical distribution of an annual sum set aside for the purpose, or a knowledge of the liability incurred by the State, and a suitable method of raising the money.

Next, we must have a standard of worth on the part of the recipient.

And lastly, some payment in money, or in kind, by the recipient to the State, in return for which the pension is given; in fact, the *quid pro quo*.

Now, given the requirements on the one hand for a defensive force, and admitting the necessity of a substitute for patriotism, and, on the other hand, given the *desiderata* in an Old Age Pension scheme, how can these ideas be so dovetailed as to make a complete and satisfactory whole?

To take these latter requirements first:—

If we gave every soldier in our Territorial Army security that on satisfactorily performing his training and making himself efficient by a military standard, with liability to serve in the defence of his country, he should receive his pension on attaining the required age, we should feel that the money set aside was economically expended as an insurance against invasion, or even hostilities.

If we only enlisted men up to the numbers which could be provided for by the amount of money we intended to spend on this purpose in any one year, making due allowance for the probabilities of human longevity and military casualties, we should have a fair idea of our liabilities.

If we imposed a special tax on the employers of such men (between certain ages), as were not either already trained, or undergoing training in some portion of His Majesty's Forces, we should have ample resources from which to draw premiums without injury to any class, and at the same time be drawing insurance money from the right source.

If we only gave pensions to those who rendered defence service to the State, we should be under no misapprehension as to the deserving character of the recipient, for not only would he have earned his pension, but if it were necessary to restrict the dimensions of the Territorial Army, we could select our pensioners by force of competition for their moral and physical worth at enlistment. Or if it were considered desirable that all able-bodied men should be allowed to qualify for pension by Service, then those who were best conducted and most efficient might either receive a better pension, or serve a shorter period.

The prepayment for the pension would be by personal service, or it could be arranged that those who were unwilling to make provision for their old age in that way might be allowed to do so by paying money-premiums to Government, as, of course, they can do now by paying into an insurance company or club. If it were thought desirable such premiums, to be paid to Government, could be compulsorily collected from all workers through their employers. But this provision would not be any necessary part of a scheme for pensioning the Territorial Army, and might be difficult of application with a fluctuating business establishment. If it were, however, feasible, it would immensely benefit recruiting for an Army in which pensions resulted from service, and there can be little doubt that the unemployed problem would lose half its terrors if the old were provided for.

Now, if we look upon the effect of such an Old Age Pension scheme upon the Territorial Army, what advantage can we find in it from the purely military standpoint?

In the first place, we should not want for numbers in the rank and file, and if we exempted from the special taxation, necessary to raise the annual pension fund, those employers who themselves rendered personal service, or made their sons do so, we should surely not want for officers. We could obtain thus the very best material for officers in all the Services of the national defence, and at the same time stimulate competition for commissions in the Auxiliary Forces.

We should not lack efficiency, for we could make the terms of service requisite to military demands, and we could enforce discipline either by lengthening the service or decreasing the pension of offenders.

We could give extra pensions for those attaining non-commissioned rank, or, possibly, in exceptional cases, for long service. Or, again, we could give extra pensions for undertaking over-sea liabilities: the liability to serve in home defence, in case of national danger, would extend to all trained within age limits, as absence on mobilisation would entail loss of pension.

But without extra pension we should have large bodies of trained men from which to call upon for Volunteers for foreign service in case of emergency. It may be said, it is true, that on these lines the Territorial Army would come mainly from the labouring classes, and Mr. Haldane has expressed the hope of obtaining recruits from that better class of civilian hitherto untouched by military fervour. Yet, the many small employers of labour would welcome personal service if they were thereby exempted from special tax. And if they did not, the experience of Volunteer officers of long service points to the fact that the labouring men are far more satisfactory, from the military point of view, than were the class from which the Volunteers came in the early days of the movement.

One other advantage would accrue from the idea of Old Age Pensions for military service, and that would be the immense stimulus given to recruiting for the Regular Army and the Navy, for the nation could

hardly leave out from a pension scheme the soldier and the sailor proper, in spite of their receiving pay, seeing how many of them end their days in poverty. But beyond this, they would no longer be unemployed on leaving the Colours, as their services would have a special value to the employer of labour in saving him in time and money, as compared with other employees; for they would have rendered their service to the State. Thus we should be saved from what now amounts to a national disgrace.

From the civilian point of view a system of military service on the lines indicated could not interfere with commercial enterprise; the obligation would fall upon all alike. The employer would be asked either to allow his men to become efficient defenders of this country, or be responsible for the payment of their pensions. Or, again, he could render himself immune from taxation on this count by himself rendering personal military service. The employee would ensure for himself an Old Age Pension without contributing money premiums; or, if he preferred, he could provide for himself by receiving reduced wages. Periods of unemployment could be arranged for by his then putting in drills; so that when he resumed work he could continue on either system.

The Volunteer would be no longer alone in his glory; and to note efficient Volunteers of long service, as first for pension, would be surely a reasonable and patriotic application of funds in any Old Age Pension scheme.

Is such a combination of these ideas, the men for defence and the provision of Old Age Pensions, practicable?

Purposely, what are termed actuarial calculations have been avoided because they do not affect the principles involved, and would be more appropriate at a later stage of development in these thoughts.

But we ought to recognise that, in order to make a beginning, a compromise would have to be arrived at between the two points of view to be reconciled.

1. The expenditure necessary to procure the *personnel* for defence, based principally on the numbers required; and

2. The amount the nation would consent to expend per annum on Old Age Pensions. In the one case the numbers considered necessary for the defence of the country would be based on strategical considerations, as estimated for the Defence Committee, and would give us the necessary annual expenditure; and in the other case, whatever the Chancellor of the Exchequer, with a new source of revenue, could put on one side for Old Age Pensions would give the key to the numbers that could be enrolled.

Other financial questions would also have to be settled; for instance, the amount of pension considered sufficient to induce good men and true to prepare themselves for the defence of their country, and here we might assume that they would be also actuated by some patriotism. The age at which the pension would become payable and whether the pension would be continued to widows of Citizen Soldiers.

And, lastly, what amount of taxation the majority of the proletariat would submit to for the purpose, either of defence or Old Age Pensions, bearing in mind the want of education and practice in patriotism and the burden of taxation already borne. Such a compromise is not beyond the scope of our administrative capabilities, and if seriously attempted would not render its great possibilities still-born by the application of the term "impracticable."

It is further claimed that a measure to fuse these two ideas would be essentially practical; indeed, it is for no other reason that these thoughts have been brought forward.

Both are new ideas for this country, and, separately, their success in either case is problematical. We are in a dilemma over our Territorial Army, and we are in no less a dilemma over the Old Age Pensions schemes that have been mooted.

If the inducements held out by Mr. Haldane are sufficient, combined with the patriotism he hopes to evoke, to provide a nation in arms, it would be wasting money to offer our defenders pensions; but there are singularly few indications of the spirit which the patriot would like to see, or of an enthusiasm capable of self-abnegation for country. It may come in time, but can we wait?

The question of Old Age Pensions is admittedly difficult, and the present Government can only hope to give a very slight assistance to the very aged, who are in unfortunate circumstances, and if that hope is fulfilled, there is a great uncertainty as to the result of such action. It might mean paving the way to distributing other concessions to an unwholesome socialistic appetite at the expense of the very sinews of the country. It may mean the manufacture of paupers, the destruction of individual responsibility, and the undoing of charity.

The scheme of providing our sons with rewards for defending their country is not idealistic, it is the practical substitute for a lost spirit of patriotism.

But, on the other hand, the idea of exacting a payment in kind for an endowment in old age is not objectionable. It does not conduce to pauperism, for it encourages rather than destroys individuality and thrift. It fosters a national spirit, a Socialism of the highest order, and it is a business-like method of preventing the State being taken in by the waster and the ne'er-do-well.

With Old Age Pensions in view, a nation in arms should soon be possible; with a nation in arms, the payment of Old Age Pensions, to all who really needed them, would be simplified, for we should be able to reduce some of our costly armaments to increase the fund available for the purpose. Such a policy then should commend itself to our many-sided citizen; it should be supported by patriot and labourer, by soldier and economist, by the Individualist and the Socialist, by the Little Englander as well as the Imperialist.

It would educate the nation in patriotism as nothing else, save war, could; for service is at once the school and test of patriotism. And if such a policy is practicable and practical, two birds will be killed by one stone, two great problems will be solved by recognising the virtue of an opportune *Quid pro Quo*.

Yours truly,

NAMDARH.

NAVAL AND MILITARY CALENDAR.

JANUARY, 1908.

1st (W.) 2nd Bn. Queen's Own Cameron Highlanders arrived in Hong Kong from South Africa in R.I.M.S. "Hardinge."

16th (Th.) 1st Bn. Yorkshire Regiment left England for Egypt in the "Soudan."

23rd (Th.) 2nd Dragoon Guards (Queen's Bays) arrived in England from South Africa in the "Braemar Castle."

31st (F.) 1st Bn. Yorkshire Regiment arrived in Egypt from England in the "Soudan."

FOREIGN PERIODICALS.

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NOTICES OF BOOKS.

Dyott's Diary. 1781-1845. — Edited by REGINALD W. JEFFERY, M.A. (Constable.) London, 1907.

It is seldom that the student of history comes across so valuable and honest a diary as that of General William Dyott, who from the year 1781 to 1845 kept a journal in which he, almost daily, recorded his adventures and reflections on matters of public and private interest; and readers of the two stout volumes, recently published by Mr. Archibald Constable, will look forward with interest to the further records of the Dyott family conditionally promised in the preface of the work under review.

"Dyott's Diary" was so obviously written for the sole use of the writer and his family, that one feels guilty, as it were, of peeping through the keyhole into the private life of that fine old English gentleman, the writer, whose weaknesses and virtues were alike those of a departed day, and who felt no more disinclination to record the fact that he and his companions "got very drunk" than that he went to church. The diary is indeed (as the editor, Mr. Jeffery, truly says) not so much the echo of the voice of the diarist, as the original voice itself, and after reading the 775 pages contained in the two volumes, we feel that it is no light praise to the author to say that we regard him with something of the same liking and with infinitely more respect than we feel for the great model of all diarists, Samuel Pepys himself.

Dyott's Diary is divided into two parts of equal interest, the first relating to the military service of the author, and the second to his life as a country gentleman. William Dyott was born in 1761, the second son of Richard Dyott, of Freeford Hall, Staffordshire, head of a family which had then held the Freeford property for two hundred years, and had been conspicuous for its loyalty in the Civil War. At the age of twenty William Dyott entered the Army as ensign in the 4th Regiment, and his first experience as a soldier was in Ireland. Military life at this period may be briefly described as all play and no work, at any rate as far as ensigns were concerned, and although Dyott doubtless performed what duty was required of him, as was ever his practice, his diary, at first, records little but constant changes of station, dances, dinners, and drink. Here and there we get glimpses of old military customs, as in the records of floggings and executions, and of occasional inspections. At Galway, for instance, the 4th Regiment were inspected by General Sir John Burgoyne, thus described: "The Commander-in-Chief seems a very well-bred man, he was perfectly civil to us, and he is as fine an old soldier as ever I saw. He made a present of twenty guineas amongst the non-commissioned officers and privates." In May 1782, Dyott was promoted Lieutenant, and in the following year, on a reduction of the Army, he was placed on half-pay, leaving, as he says, "The King's Own, a corps I ever shall revere." In December, 1784, he succeeded in being brought back into the 4th, then at Dublin, and in the following April was appointed Adjutant. Dublin he found a very pleasant quarter, but the duties were heavy, over 200 men mounting guard daily. The next station was Cork, where the chief business of the officers was eating strawberries. Cork, according to Dyott, was a bad station: "the men in the barracks were obliged to pay for the water they drank, and used for washing after" — a picturesque but exaggerated phrase, we presume.

In 1787 Dyott accompanied his regiment to Nova Scotia, where he had a very good time, and became the chosen boon companion of Prince William Henry, afterwards King William IV. There are many details concerning military, ceremonial and other customs at the period, which will interest a variety of readers. Dyott was promoted Captain in 1793, and two years later became Lieutenant-Colonel of the 25th Regiment, with which he went to the West Indies, seeing severe fighting at Grenada in 1796. His narrative of his experiences at this period has much interest, giving an excellent idea of a little known campaign, and describing vividly the neglect with which the army was treated by Government, and the consequent sufferings and mortality of the troops.

In 1800 Dyott became a Colonel, and the good state of his Regiment having attracted the notice of George III., he was appointed Aide-de-Camp to the King in 1801.

Colonel Dyott's next service was in Egypt, where he saw some fighting near Alexandria, and showed himself a good soldier. On his return home he was employed as a Brigadier-General in Ireland when not in attendance on the King.

In 1808 Dyott embarked for service under Sir John Moore, in Spain but on his outward voyage heard of Moore's death and the consequent abandonment of the campaign. After this incident General Dyott's last experience of active service was in the Walcheren expedition, where he commanded a brigade and was one of the few officers of his, or, indeed, any, rank, who remained fit for duty. The horrors of Walcheren are well known, but are vividly shown in the diary. The miserable buildings in

which the troops lived, and the even worse conditions in which the sick were housed, were the principal causes of the terrible sickness which prevailed.

From 1810 to 1813 General Dyott served on the Home Staff, having his head-quarters at Lichfield, a convenient station, as his property lay in the immediate vicinity. While holding this command the General had to deal with the Luddite riots, and in this connection his diary affords an interesting picture of the disorders into which a great part of England was plunged at the time, disorders which indicated the first stages of those industrial troubles which still disturb our domestic politics.

On the expiration of his command, General Dyott settled down to his duties as a country gentleman, working incessantly to improve the condition of his property and of his tenants, and devoting great care to the education of his motherless children.

In spite of a share of the troubles which befall all but the most fortunate of men, General Dyott's long life was a happy and an interesting one. He lived to the age of 84 and kept up his diary with the utmost regularity for no less than 64 years. He had the good fortune to maintain his clearness of mind and interest in his surroundings to the very last, and on April 3rd, 1845, but shortly before his death, made his last entry: "on the 3rd begun sowing barley."

The day of such men as General Dyott has entirely passed away. We live in a different England to that which Dyott loved and served so faithfully. He and the men of his class and period had, some may think, deficient sympathies and over-strong prejudices. They were, however, ever forward supporters of law and order in times when both were threatened; they believed that it was sufficient to help the deserving and that it was well to punish evil-doers; and who shall say that they were wrong? The picture of their day presented in "Dyott's Diary" is, therefore, most interesting and most valuable, and there are few books which throw more light on the epoch when European civilisation was violently transformed by the French Revolution and England alone effected her passage from ancient to modern conditions by a gradual and peaceful process.

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